



PROJECT ID: LNEMA08WS

THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

30-30 THOMSON AVENUE  
LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000  
WEBSITE [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc)

**LAW**

VOLUME 1 OF 3

# BID BOOKLET

FOR FURNISHING ALL LABOR AND MATERIALS  
NECESSARY AND REQUIRED FOR:

## Woodstock Branch Library Renovation and ADA Compliance

LOCATION:  
BOROUGH:  
CITY OF NEW YORK

761 East 160th Street  
Bronx 10456

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

NYPL

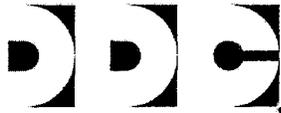
RICE + LIPKA ARCHITECTS



Date: March 14, 2013

3-039

3-039



NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

RAMON RODRIQUEZ  
Acting Agency Chief  
Contracting Officer

April 04, 2014

CERTIFIED MAIL - RETURN RECEIPT REQUEST  
NATIONAL ENVIRONMENTAL SAFETY COMPANY CORP. INC.  
12-17 38th Avenue  
Long Island City, NY 11101

RE: FMS ID: LNEMA08WS  
E-PIN: 85013B0094001  
DDC PIN: 8502013LN0002C  
WOODSTOCK BRANCH LIBRARY  
RENOVATION AND ADA COMPLIANCE -  
BOROUGH OF THE BRONX  
**NOTICE OF AWARD**

Dear Contractor:

You are hereby awarded the above referenced contract based upon your bid in the amount of \$5,655,320.00 submitted at the bid opening on August 08, 2013. Within ten (10) days of your receipt of this notice of award, you are required to take the actions set forth in Paragraphs (1) through (3) below. For your convenience, attached please find a copy of Schedule A of the General Conditions to the Contract, which sets forth the types and amounts of insurance coverage required for this contract.

- (1) Execute four copies of the Agreement in the Contracts Unit, 30-30 Thomson Avenue, 1<sup>st</sup> Floor, Long Island City, New York (IDCNY Building). A Commissioner of Deeds will be available to witness and notarize your signature. The Agreement must be signed by an officer of the corporation or a partner of the firm.
- (2) Submit to the Contracts Unit four properly executed performance and payment bonds. If required for this contract, copies of performance and payment bonds are attached.
- (3) Submit to the Contracts Unit the following insurance documentation: (a) original certificate of insurance for general liability in the amount required by Schedule A, and (b) original certificates of insurance or other proof of coverage for workers' compensation and disability benefits, as required by New York State Law. The insurance documentation specified in this paragraph is required for registration of the contract with the Comptroller's Office.



On or before the contract commencement date, you are required to submit all other certificates of insurance and/or policies in the types and amounts required by Schedule A. Such certificates of Insurance and/or policies must be submitted to the Agency Chief Contracting Office, Attention: Risk Manager, Fourth Floor at the above indicated department address.

Your attention is directed to the section of the Information for Bidders entitled "Failure to Execute Contract". As indicated in this section, in the event you fail to execute the contract and furnish the required bonds within the (10) days of your receipt of this notice of award, your bid security will be retained by the City and you will be liable for the difference between your bid price and the price for which the contract is subsequently awarded, less the amount of the bid security retained.

Sincerely,

Lorraine Holley  
DACCO

#2

BID FORM  
THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF STRUCTURES

BID FOR FURNISHING ALL LABOR AND  
MATERIAL NECESSARY AND REQUIRED FOR:

PROJECT ID: LNEMA08WS

Woodstock Branch Library Renovation and ADA Compliance  
761 East 160th Street  
Bronx 10456

Name of Bidder: National Environmental Safety Co Inc.

Date of Bid Opening: August 8, 2013

Bidder is: (Check one, whichever applies) Individual ( ) Partnership ( ) Corporation

Place of Business of Bidder: 12-17 38th Avenue, L.I.C., NY 11101

Bidder's Telephone Number: (718) 361-0044 Bidder's Fax Number: (718) 361-0846

Bidder's Email Address: national@nesco.cc

Residence of Bidder (If Individual): \_\_\_\_\_

If Bidder is a Partnership, fill in the following blanks:

Names of Partners	Residence of Partners
<u>N.A.</u>	_____
_____	_____
_____	_____

If Bidder is a Corporation, fill in the following blanks:

Organized under the laws of the State of New York

Name and Home Address of President: Dominick Fertitta, President  
28-35 206th Street, Bayside, New York 11360

Name and Home Address of Secretary: Mark Canellos, Vice President  
24-40 Little Neck Blvd, Bayside, NY 11360

Name and Home Address of Treasurer: \_\_\_\_\_

BID FORM

PROJECT ID: LNEMA08WS

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

A. LUMP SUM PRICE - Total price for all labor and material for all required work, excluding items (B) and (C) set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price For Labor

Total Price for Material Sold and Delivered

\$ 3,562,859.00+

\$ 1,994,200.00

Total Price for Item A= \$ 5,557,059.00

B. ALLOWANCE for Incidental Asbestos Abatement (Section 028013 of the Specifications)

\$30,000.00

C. AMOUNT for Proprietary Items (pages 2a-2f)

\$68,261.00

TOTAL BID PRICE (Add A + B + C) (a/k/a BID PROPOSAL)

\$ 5,655,320.00

8/8/13 P.S

BIDDER'S SIGNATURE AND AFFIDAVIT

\* SUBCONTRACTOR IDENTIFICATION: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". [checked] Yes [ ] No

\* M/WBE UTILIZATION PLAN: By signing its bid in the space below, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Section V: Vendor Certification and Required Affirmations: I hereby: 1) acknowledge my understanding of the M/WBE participation requirements as set forth in this Contract and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York and the rules promulgated thereunder; 2) affirm that the information supplied in support of the M/WBE Utilization Plan is true and correct; 3) agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract; 4) agree and affirm that it is a material term of this Contract that the Vendor will award the total dollar value of the M/WBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such goals are modified by the Agency; and 5) agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms.

Bidder:

National Environmental Safety Co, Inc.

By:

Mundals v.p

(Signature of Partner or corporate officer)

Mundals secretary

Attest:

Secretary of Corporate Bidder

(Corporate Seal)

Affidavit on the following page should be subscribed and sworn to before a Notary Public

**BID FORM (TO BE NOTARIZED)**

\*\*\*\*\*

**AFFIDAVIT WHERE BIDDERS IS AN INDIVIDUAL**

STATE OF NEW YORK, COUNTY OF \_\_\_\_\_ ss:  
\_\_\_\_\_ being duly sworn says:

I am the person described in and who executed the foregoing bid, and the several matters therein stated are in all respects true.

\_\_\_\_\_  
(Signature of the person who signed the Bid)

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_,

\_\_\_\_\_  
Notary Public

\*\*\*\*\*

**AFFIDAVIT WHERE BIDDERS IS A PARTNERSHIP**

STATE OF NEW YORK, COUNTY OF \_\_\_\_\_ ss:  
\_\_\_\_\_ being duly sworn says:

I am a member of \_\_\_\_\_ the firm described in and which executed the foregoing bid.  
subscribed the name of the firm thereto on behalf of the firm, and the several matters therein stated are in all respects true.

\_\_\_\_\_  
(Signature of Partner who signed the Bid)

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_,

\_\_\_\_\_  
Notary Public

\*\*\*\*\*

**AFFIDAVIT WHERE BIDDERS IS A CORPORATION**

STATE OF NEW YORK, COUNTY OF Queens ss:  
Mark Canellos being duly sworn says:

I am the Vice President of the above named corporation whose name is subscribed to and which executed  
the foregoing bid. I reside at 24-40 Little Neck Blvd, Bayside, NY 11360  
I have knowledge of the several matters therein stated, and they are in all respects true.

*Mark Canellos*  
(Signature of Corporate Officer who signed the Bid)

Subscribed and sworn to before me this  
8<sup>th</sup> day of August, 2013

*Jamie Rivera*  
Notary Public  
Notary Public State of New York  
Bronx County  
Lic. #01RI6245854  
Comm. Exp. August 8, 2015

**AFFIRMATION**

The undersigned bidder affirms and declares that said bidder is not in arrears to the City of New York upon debt, contract or taxes and is not a defaulter, as surety or otherwise, upon obligation to the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except None

(If none, the bidder shall insert the word "None" in the space provided above.)

Full Name of Bidder: National Environmental Safety Co. Inc.  
Address: 12-17 38<sup>th</sup> Avenue  
City: Lat. C. State: New York Zip Code: 11101

CHECK ONE BOX AND INCLUDE APPROPRIATE NUMBER:

A - Individual or Sole Proprietorship \*  
SOCIAL SECURITY NUMBER

B - Partnership, Joint Venture or other unincorporated organization  
EMPLOYER IDENTIFICATION NUMBER

C - Corporation  
EMPLOYER IDENTIFICATION NUMBER

11-293 9703

By: Mundlos VP  
Signature:

Title: Vice President

If a corporation, place seal here

This affirmation must be signed by an officer or duly authorized representative.  
\* Under the Federal Privacy Act the furnishing of Social Security Numbers by bidders on City contracts is voluntary. Failure to provide a Social Security Number will not result in a bidder's disqualification. Social Security Numbers will be used to identify bidders, proposers or vendors to ensure their compliance with laws, to assist the City in enforcement of laws, as well as to provide the City a means of identifying of businesses which seek City contracts.

**Qualification Form**

Project ID: LNEMA08WS

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: National Environmental Safety Co. Inc

Name of Project: \_\_\_\_\_

Location of Project: Please See Attached

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: \_\_\_\_\_

Title: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Brief description of work completed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was the work performed as a prime or a subcontractor: \_\_\_\_\_

Amount of Contract: \_\_\_\_\_

Date of Completion: \_\_\_\_\_

\*\*\*\*\*

Name of Contractor: \_\_\_\_\_

Name of Project: \_\_\_\_\_

Location of Project: \_\_\_\_\_

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: \_\_\_\_\_

Title: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Brief description of work completed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was the work performed as a prime or a subcontractor: \_\_\_\_\_

Amount of Contract: \_\_\_\_\_

Date of Completion: \_\_\_\_\_

**National Environmental Safety Company, Inc.**  
**12-17 38th Avenue**  
**Long Island City, NY 11101**

**On-Going and Completed Projects**

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 149K
Description	Asbestos Abatement / Roofing / Masonry / Electrical / Concrete Work / Interior and Exterior Painting / Chemical Injection Grouting / (Landmark Building)
Contract Amount	\$3,548,000.00
Contact Name	Carlos Martinez - (347) 386-1397
Completion Date	2/2011

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 39K
Description	Asbestos Abatement / Roofing / Masonry / Electrical / Interior Renovation / Painting / Window Installation (Landmark Building)
Contract Amount	\$3,519,000.00
Contact Name	Ronald Mezi - (718) 472-8000
Completion Date	3/2009

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 33X
Description	Asbestos Abatement / HVAC / Plumbing / Electrical / Structural Concrete / Fireproofing / Structural Steel / Waterproofing / Flooring
Contract Amount	\$3,262,000.00
Contact Name	Robert Friant - (917) 335-2189
Completion Date	9/2010

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 224K
Description	Asbestos Abatement / HVAC / Plumbing / Roofing / Masonry / Chemical Injection Grouting / Terra Cotta Replacement / Interior and Exterior Painting / Concrete (Landmark Building)
Contract Amount	\$6,318,000.00
Contact Name	Llewellyn Lenon - (917) 662-1591
Completion Date	8/2011

Agency Owner	New York City School Construction Authority
Name / Job Location	Stevenson High School
Description	Asbestos Abatement / HVAC / Electrical / Plumbing / Roofing / Flooring / Custom Casework / Acoustical Ceiling / Door Replacement / Painting
Contract Amount	\$6,326,000.00
Contact Name	Latif Giwa - (646) 772-4023
Completion Date	9/2010

**National Environmental Safety Company, Inc.**  
**12-17 38th Avenue**  
**Long Island City, NY 11101**

**On-Going and Completed Projects**

Agency Owner	New York City School Construction Authority
Name / Job Location	LaGuardia High School
Description	Asbestos Abatement / Electrical / Roofing / Painting / Window Replacement / Window Shades
Contract Amount	\$7,669,000.00
Contact Name	George Kambouris - (917) 417-1841
Completion Date	8/2011

Agency Owner	New York City School Construction Authority
Name / Job Location	West Brooklyn - Windows
Description	Asbestos Abatement / Painting / Window Replacement / Window Shades / Window Guard Replacement / Masonry
Contract Amount	\$1,968,000.00
Contact Name	Roger Okewole - (646) 221-4413
Completion Date	9/2010

Agency Owner	DASNY (Construction Manager: TDX Construction)
Name / Job Location	Bronx Community College
Description	General Conditions Package (New Building), Masonry / Precast Panels / GFRC Panels / Custom Casework / Flooring / Fireproofing / Concrete / Rough Carpentry
Contract Amount	\$18,339,000.00
Contact Name	Prakash - (917) 509-9894
Completion Date	On-Going - 90% Complete

Agency Owner	NYCHA (Construction Manager: Liro Program & Construction Management PC)
Name / Job Location	Edenwald Houses - North & South
Description	Bathroom Renovations - Carpentry / Demolition / Electrical / Asbestos Abatement
Contract Amount	\$18,570,500.00
Contact Name	David Wong - (347) 415-5301
Completion Date	2/2011

Agency Owner	NYCHA (Construction Manager: STV Construction)
Name / Job Location	Unity Houses
Description	Roof Replacement - Carpentry / Demolition / Asbestos Abatement / Roof Rails
Contract Amount	\$4,654,000.00
Contact Name	Andre Watts - (646) 823-5463
Completion Date	9/2011

**National Environmental Safety Company, Inc.**  
**12-17 38th Avenue**  
**Long Island City, NY 11101**

**On-Going and Completed Projects**

Agency Owner	New York City School Construction Authority
Name / Job Location	Walton High School
Description	Swimming Pool/ Flood Elimination/Asbestos Abatement / HVAC / Plumbing / Windows
Contract Amount	\$14,642,000.00
Contact Name	Nelson Marty - (917) 752-5704
Completion Date	3/2011

Agency Owner	New York City School Construction Authority
Name / Job Location	IS 210Q
Description	Accessibility - Elevator Installation, Roofing, Interior Renovation, Asbestos abatement, HVAC and Plumbing work within 8 occupied and unoccupied bathrooms in the school
Contract Amount	\$3,748,000.00
Contact Name	Henry Sanchez - (718) 752-5954
Completion Date	8/2009

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 110K, 124 Monitor Street, Brooklyn, NY
Description	Full Program Accessibility - Elevator Installation / New Building Structure / Asbestos Abatement / Masonry / Roofing / Concrete / Window Installation / Interior and Exterior Painting / HVAC / Plumbing / Electrical
Contract Amount	\$4,869,000.00
Contact Name	Delicia Ventura - (718) 472-8084
Completion Date	7/2009

Agency Owner	New York City School Construction Authority
Name / Job Location	West Brooklyn High School
Description	Science Lab Renovation, Asbestos Abatement, Electrical, HVAC, Plumbing
Contract Amount	\$1,405,000.00
Contact Name	(718) 752-3179
Completion Date	7/2009

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 75K
Description	Interior Renovation / Auditorium Upgrade / Masonry
Contract Amount	\$1,606,000.00
Contact Name	Vyacheslav Aronov - (646) 210-7206
Completion Date	8/2009

**National Environmental Safety Company, Inc.**  
**12-17 38th Avenue**  
**Long Island City, NY 11101**

**On-Going and Completed Projects**

Agency Owner	New York City School Construction Authority
Name / Job Location	IS 167M
Description	Window Replacement, Asbestos Abatement, Electricval Upgrade
Contract Amount	\$1,606,000.00
Contact Name	Vyacheslav Aronov - (646) 210-7206
Completion Date	9/2009

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 75X, 984 Faile Street, Bronx, NY
Description	Exterior Masonry including demolition and re-build of all parapets and installation of new terracotta throughout / Interior Renovation / Asbestos Abatement / Demolition / HVAC / Electrical / Plumbing in 26 occupied and unoccupied bathrooms throughout the school (Landmark Building)
Contract Amount	\$12,000,000.00
Contact Name	Abdul Shaheen - (917) 417-7068
Completion Date	2/2008

Agency Owner	New York City School Construction Authority
Name / Job Location	Van Arsdale High School
Description	Interior Renovation, Asbestos Abatement, Demolition, HVAC and plumbing work within 12 Occupied and Unoccupied Bathrooms in the school (Landmark Building)
Contract Amount	\$2,300,000.00
Contact Name	Everton Mack - 917-418-3410
Completion Date	12/2008

Agency Owner	New York City School Construction Authority
Name / Job Location	Christopher Columbus High School
Description	Interior Renovation, Asbestos Abatement, Demolition, HVAC and plumbing work in 12 Occupied and Unoccupied Bathrooms within the school - Classroom renovation
Contract Amount	\$4,952,000.00
Contact Name	Tanweer Warraich - 917-217-1431
Completion Date	3/2009

**National Environmental Safety Company, Inc.**  
**12-17 38th Avenue**  
**Long Island City, NY 11101**

**On-Going and Completed Projects**

Agency Owner	New York City School Construction Authority
Name / Job Location	Repertory Town Hall High School
Description	Interior Renovation, Asbestos Abatement, Demolition, HVAC and plumbing work in 6 Occupied and Unoccupied Bathrooms within the school / Painting (Landmark Building)
Contract Amount	\$2,500,000.00
Contact Name	Vijay Jaikeran - 917-559-5169
Completion Date	1/2008

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 132X, 1245 Washington Avenue, Bronx, NY
Description	Exterior Masonry / Windows / Paved Areas
Contract Amount	\$7,628,000.00
Contact Name	Leonard Ferguson - 917-939-1635
Completion Date	1/2009

Agency Owner	New York City School Construction Authority
Name / Job Location	Martin Luther King High School,
Description	Multi Campus Transition - Interior Renovation, Asbestos Abatement
Contract Amount	\$4,982,000.00
Contact Name	George Kambouris - 917-417-1841
Completion Date	2/2008

Agency Owner	The Liro Group & Department of Design & Construction
Name / Job Location	FDNY R&T Building, Queens, NY
Description	6,000 sq ft of Interior Renovation / Exterior Renovation / Boiler Removal / Asbestos Abatement / New Sidewalks
Contract Amount	\$2,500,000.00
Contact Name	Matthew Ianuzzi - 917-559-8296
Completion Date	5/2009

Agency Owner	Skanska USA & Department of Design & Construction
Name / Job Location	Public Health Labs, 455 First Avenue, New York, NY 10016
Description	10 Floors of Interior Renovation - Including: Walls, Floors, Ceilings and Painting / General Construction / Exterior Masonry / Roofing / Asbestos Abatement / Scaffolding
Contract Amount	\$8,618,000.00
Contact Name	Andrew Eckl - 212-679-6190
Completion Date	12/2008

**National Environmental Safety Company, Inc.**  
**12-17 38th Avenue**  
**Long Island City, NY 11101**

**On-Going and Completed Projects**

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 16K
Description	Masonry, Bulding Parapet, Exterior Renovation
Contract Amount	\$4,800,000.00
Contact Name	Delicia Ventura - (718) 472-8084
Completion Date	9/2008

Agency Owner	The Liro Group & Department of Design & Construction
Name / Job Location	Park Slope Armory Revitalization
Description	66,000 sq ft of Interior Renovation / Exterior Renovation / Roofing / Stadium Seating / New Running Track with Basketball Courts and Boxing Rink (Landmark Building)
Contract Amount	\$5,750,000.00
Contact Name	Arthur Johansen - (516) 938-5476
Completion Date	7/2008

Agency Owner	State University Construction Fund
Name / Job Location	College of Optometry, NY
Description	Renovation of 16 Floors, replacement of steam system, asbestos abatement, ceiling replacement, buildout, drywall, partitions, windows, HVAC, plumbing, electrical telecommunications and window installation
Contract Amount	\$8,800,000.00
Contact Name	Chuck Rodriguez - 518-443-5780
Completion Date	8/2000

Agency Owner	TDX Construction Corp.
Name / Job Location	Q667 - Skillman High School
Description	15,000 sq ft of Interior Renovation - Including: Doors, Floors, Wall and Painting / Demo / Asbestos Abatement / Interior Buildout / Exterior Renovation /
Contract Amount	\$7,900,000.00
Contact Name	Stephen McGrath - 646-296-4374
Completion Date	10/2005

Agency Owner	TDX Construction Corp.
Name / Job Location	Columbus High School, 925 Astor Avenue, Bronx, NY
Description	25,000 sq ft of interior renovation on various floors
Contract Amount	\$4,500,000.00
Contact Name	Stephen McGrath - 646-296-4374
Completion Date	2/2006

**National Environmental Safety Company, Inc.**  
**12-17 38th Avenue**  
**Long Island City, NY 11101**

**On-Going and Completed Projects**

Agency Owner	Liro Group & Management PC
Name / Job Location	Lehman High School - 3000 East Tremont Avenue, Bronx, NY
Description	120,000 sq ft of Interior Renovation / Demo & Re-Build / Renovation of 14 bathrooms
Contract Amount	\$5,314,000.00
Contact Name	Bijan Radafshar - 917-559-8291
Completion Date	9/2005

Agency Owner	New York City School Construction Authority
Name / Job Location	BOE Bureau Building, 44-01 Vernon Blvd, LIC, NY
Description	Interior / Exterior Renovation / Bathroom Renovations / Window Installation / Asbestos Abatement, Plumbing, HVAC / Boiler Work
Contract Amount	\$13,000,000.00
Contact Name	Nadeem Zerriny - 347-893-0082
Completion Date	11/2002

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 114K, 1077 Remsen Avenue, Brooklyn, NY
Description	Interior / Exterior Renovation / Window Installation / Asbestos Abatement, Plumbing, HVAC
Contract Amount	\$5,000,000.00
Contact Name	Colin Albert - 917-418-5971
Completion Date	9/2007

Agency Owner	New York City School Construction Authority
Name / Job Location	Telecom Communications High School, Brooklyn, NY
Description	Exterior Renovation, Masonry, Roofing, Asbestos Abatement, Plumbing, HVAC , Electrical
Contract Amount	\$4,138,000.00
Contact Name	Bassam Abdu - 917-418-5971
Completion Date	On-Going - 70% Complete

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 232X, 1700 Macombs Road, Bronx, NY
Description	Interior / Exterior Renovation, Window Installation, Asbestos Abatement, Plumbing, HVAC, Electrical, New Addition, Elevator Installation
Contract Amount	\$8,193,000.00
Contact Name	Jagdish Khana - 718-583-2161
Completion Date	On-Going -60% Complete

National Environmental Safety Company, Inc.  
12-17 38th Avenue  
Long Island City, NY 11101

On-Going and Completed Projects

Agency Owner	New York City School Construction Authority
Name / Job Location	PS 217M, 201 Main Street, New York, NY
Description	Interior / Exterior Renovation, Window Installation, Plumbing, HVAC, Electrical, Roofing
Contract Amount	\$8,444,000.00
Contact Name	Jean Clerie - 718-472-8000
Completion Date	On-Going - 60% Complete

Agency Owner	CUNY / Hill International
Name / Job Location	Brooklyn College, Brooklyn, NY
Description	Exterior Renovation Site Wor, Demolition / Excavation, Plumbing, HVAC, Electrical
Contract Amount	\$2,096,000.00
Contact Name	David Oldham - 646-206-5681
Completion Date	On-Going - 35% Complete

NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation  
 Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.  
 FMS ID No:LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
<b>CONTRACT 1 - GENERAL CONSTRUCTION Work</b>									
010000	Division 1 General Requirement								
	Mobilization	1	LS	50,000	50,000.00	150000	174,500.00	224,500.00	
	Temporary Utilities	1	LS	5,000.00	5,000.00	10,000.00	10,000.00	15,000.00	
	Sidewalk Bridge	100	LF	150.00	15,000.00	100.00	10,000.00	25,000.00	
	Interior Scaffolding	1	LS	5,000.00	5,000.00	10,000.00	10,000.00	15,000.00	
017419	Construction Waste Requirements	1	LS	10,000.00	10,000.00	15,000.00	15,000.00	25,000.00	
018113	Sustainable Design Requirements	1	LS	3,000.00	3,000.00	7,000.00	7,000.00	10,000.00	
018119	Construction IAQ Requirements	1	LS	5,000.00	5,000.00	15,000.00	15,000.00	20,000.00	
019100	General Commissioning Requirement	1	LS	5,000.00	5,000.00	10,000.00	10,000.00	15,000.00	
	<b>Subtotal</b>				<b>98,000.00</b>		<b>251,500.00</b>	<b>349,500.00</b>	
002000	Division 2 - Existing Conditions								
024119	Selective Demolition and Alteration Work								
	<b>Basement</b>								
	Take down and set aside for re-use mechanical extract louver on GL 1 a-b	2	EA	25.00	50.00	64.00	128.00	178.00	
	Take down and cart-away existing door, frame and architraves	3	EA	110.00	330.00	321.00	963.00	1,293.00	
	Take down and cart-away drywall/partitions	72	LF	3.00	216.00	6.50	468.00	684.00	
	Form door opening in existing partition and make good surrounds	1	EA	110.00	110.00	385.00	385.00	495.00	
	Take down and cart-away stairs and make good	1	FLT	265.00	265.00	640.00	640.00	905.00	
	Cut ground floor slab to enable forming of new lift pit	52	SF	3.00	156.00	3.25	169.00	325.00	
	Cut ground floor slab to enable removal and relocation of waste line	17	LF	6.00	102.00	32.00	544.00	646.00	
	Remove waste line	17	LF	2.00	34.00	6.50	110.50	144.50	
	Demolition of existing dumb waiter, removal doors and all conveying equipment	1	EA	325.00	325.00	640.00	640.00	965.00	
	Remove upper portion of window on GL 7 b-c and prepare for new mechanical louver	1	LS	25.00	25.00	96.00	96.00	121.00	

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
024119	Remove elevator sump pump	1	EA	55.00	55.00	353.00	353.00	408.00	408.00
	Remove radiator (to be relocated)	1	EA	55.00	55.00	290.00	290.00	345.00	345.00
	Remove HW pipe	1	LS	225.00	225.00	385.00	385.00	610.00	610.00
	Remove ductwork	1	LS	225.00	225.00	640.00	640.00	865.00	865.00
	Remove multi zone AC unit	1	EA	110.00	110.00	320.00	320.00	430.00	430.00
	Remove MEP items	1	LS	325.00	325.00	770.00	770.00	1,095.00	1,095.00
	Miscellaneous electrical demolition: remove equipment, wiring, and associated conduit	1	LS	110.00	110.00	450.00	450.00	560.00	560.00
	<b>Ground Level</b>								
	Take down and cart away granite saddle/threshold; protect adjacent building fabric	1	EA	25.00	25.00	150.00	150.00	175.00	175.00
	Take down, set aside for reuse and reinstall historic plaque	1	EA	55.00	55.00	415.00	415.00	470.00	470.00
	Allow for temporary protection of external lanterns	1	PAR	225.00	225.00	320.00	320.00	545.00	545.00
	Take down and cart away stairs	2	FLT	325.00	650.00	1,240.00	1,240.00	1,890.00	1,890.00
	Remove structural concrete encased steel beam	188	LF	17.00	3,196.00	40.00	7,520.00	10,716.00	10,716.00
	Temporary shoring concrete slab-below beam removed	188	LF	17.00	3,196.00	30.00	5,640.00	8,836.00	8,836.00
	Removal of floor slab, measure on plan, make good as required	556	SF	3.00	1,668.00	6.00	3,336.00	5,004.00	5,004.00
	Take up and cart away existing carpet, adhesives and associated sundries	3,135	SF	2.00	6,270.00	2.00	6,270.00	12,540.00	12,540.00
	Remove existing ceiling @ area to be repair	1,123	SF	3.00	3,369.00	4.00	4,492.00	7,861.00	7,861.00
	Demolition of existing dump waiter shaft	2	EA	325.00	650.00	620.00	1,240.00	1,890.00	1,890.00
	Take up floor tiles from restrooms and make good slab to receive new finish	36	SF	2.00	72.00	4.00	144.00	216.00	216.00
	Take down, cart away and make good windows on 1st floor north elevation	185	SF	5.00	925.00	9.00	1,665.00	2,590.00	2,590.00
	Strip of built in millwork and the like	672	SF	8.00	5,376.00	20.00	13,440.00	18,816.00	18,816.00
	Remove existing column encasements, ensuring no damage to existing columns and protect until new encasement have been installed	2	EA	550.00	1,100.00	1,400.00	2,800.00	3,900.00	3,900.00
	Localized removal of terracotta wall tiles to enable installation of new structural elements of stairs	1	LS	325.00	325.00	1,400.00	1,400.00	1,725.00	1,725.00

NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation  
 Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.  
 FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
024119	Remove window shade	3	EA	12.00	36.00	20.00	60.00	96.00
	Remove window sill	29	LF	6.00	174.00	14.00	406.00	580.00
	Remove exterior wall below window removed	130	SF	6.00	780.00	14.00	1,820.00	2,600.00
	Remove existing single door and frame	11	EA	55.00	605.00	340.00	3,740.00	4,345.00
	Remove interior CMU/Drywall partition	174	LF	40.00	6,960.00	83.00	14,442.00	21,402.00
	Concrete slab opening: remove concrete slab & reinforcement	53	SF	5.00	265.00	8.50	450.50	715.50
	Sawcut existing concrete slab to be removed	155	LF	4.00	620.00	8.00	1,240.00	1,860.00
	Temporary shoring concrete slab - around opening	30	LF	17.00	510.00	35.00	1,050.00	1,560.00
	New pipe penetration	14	EA	55.00	770.00	340.00	4,760.00	5,530.00
	Remove existing step flooring	1	LS	325.00	325.00	700.00	700.00	1,025.00
	Remove existing toilet & associated piping	2	EA	30.00	60.00	90.00	180.00	240.00
	Remove existing lavatory & associated piping	3	EA	30.00	90.00	90.00	270.00	360.00
	Remove toilet accessories	1	LS	110.00	110.00	250.00	250.00	360.00
	Remove exg. convectors cover. Prepare for installation of new cover	6	EA	55.00	330.00	275.00	1,650.00	1,980.00
	Remove exg. Covectors (fin tube & cover)	3	EA	35.00	105.00	180.00	540.00	645.00
	Remove exg. Covectors (fin tube & cover). Cap piping	3	EA	55.00	165.00	300.00	900.00	1,065.00
	Remove HW pipe	1	LS	110.00	110.00	300.00	300.00	410.00
	Remove pendant fixture	24	EA	225.00	5,400.00	1,000.00	24,000.00	29,400.00
	Remove smoke detector	2	EA	12.00	24.00	17.00	34.00	58.00
	Remove wall mounted fixture	84	LF	12.00	1,008.00	12.00	1,008.00	2,016.00
	Remove smoke detector		EA			17.00		
	Remove clock & SIM	2	EA	12.00	24.00	17.00	34.00	58.00
	Remove all existing conduit and telecom wiring on north façade	1	LS	110.00	110.00	375.00	375.00	485.00
	Miscellaneous electrical demolition: remove equipment, wiring and associated conduit	1	LS	225.00	225.00	620.00	620.00	845.00
	Relocation of HW piping above ceiling at first floor windows							
	Removals							

NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
024119	Remove ceiling	58	SF	3.00	174.00	4.00	232.00	406.00	
	Remove existing ceiling trim	29	LF	3.00	87.00	4.00	116.00	203.00	
	Remove HW pipes	29	LF	5.00	145.00	15.00	435.00	580.00	
	<b>Mezzanine</b>								
	Sawcut existing concrete slab to be removed	63	LF	4.00	252.00	8.00	504.00	756.00	
	Temporary shoring concrete slab - around opening	63	LF	17.00	1,071.00	35.00	2,205.00	3,276.00	
	Remove existing beam	72	LF	12.00	864.00	35.00	2,520.00	3,384.00	
	Temporary shoring concrete slab - below beam removed	72	LF	17.00	1,224.00	35.00	2,520.00	3,744.00	
	Remove ductwork	70	LF	12.00	840.00	18.00	1,260.00	2,100.00	
	Remove MEP items	1	LS	225.00	225.00	750.00	750.00	975.00	
	Remove existing column encasements; ensuring no damage to existing columns and protect until new encasements have been installed	2	EA	275.00	550.00	1,500.00	3,000.00	3,550.00	
	Take down and cart away stairs	2	FLT	325.00	650.00	620.00	1,240.00	1,890.00	
	Localized removal of terracotta wall tiles to enable installation of new structural elements of stairs	1	LS	225.00	225.00	1,000.00	1,000.00	1,225.00	
	Demolition of existing dumb waiter shaft	1	LS	325.00	325.00	900.00	900.00	1,225.00	
	Removal of floor slab; measure on plan, make good as required	119	SF	4.00	476.00	7.00	833.00	1,309.00	
	Demolition of existing masonry riser shaft and make good floor and ceiling (136 sf)	1	LS	800.00	800.00	2,000.00	2,000.00	2,800.00	
	<b>Second Floor</b>								
	Remove existing single door & frame	4	EA	55.00	220.00	340.00	1,360.00	1,580.00	
	Remove existing double door & frame	1	EA	80.00	80.00	500.00	500.00	580.00	
	Remove window shade	6	EA	12.00	72.00	20.00	120.00	192.00	
	Remove 3x5 window @ stage	2	EA	35.00	70.00	90.00	180.00	250.00	
	Remove CMU/Drywall partition	100	LF	6.00	600.00	12.00	1,200.00	1,800.00	
	Removal of floor slab; measure on plan, make good as required	280	SF	5.00	1,400.00	7.00	1,960.00	3,360.00	
	Sawcut existing concrete slab to be removed	96	LF	4.00	384.00	7.00	672.00	1,056.00	

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
024119	Temporary shoring concrete slab - around opening	96	LF	17.00	1,632.00	30.00	2,880.00	4,512.00
	Remove existing beam	62	LF	12.00	744.00	35.00	2,170.00	2,914.00
	Temporary shoring concrete slab - below beam removed	62	LF	17.00	1,054.00	30.00	1,860.00	2,914.00
	Remove existing stairs & associated enclosure & anchors	2	FLT	325.00	650.00	620.00	1,240.00	1,890.00
	Remove existing tile flooring at toilets	23	SF	2.00	46.00	4.00	92.00	138.00
	Remove existing toilet & associated piping	1	EA	25.00	25.00	90.00	90.00	115.00
	Remove existing lavatory & associated piping	1	EA	27.00	27.00	90.00	90.00	117.00
	Remove existing janitor sink & associated piping	1	EA	27.00	27.00	90.00	90.00	117.00
	Remove toilet accessories	1	LS	110.00	110.00	250.00	250.00	360.00
	Remove exg. Connectors cover, prepare for installation of new cover	6	EA	55.00	330.00	275.00	1,650.00	1,980.00
	Remove exg. Connectors (fin tube & cover)	6	EA	55.00	330.00	250.00	1,500.00	1,830.00
	Remove HW pipes	1	LF	225.00	225.00	620.00	620.00	845.00
	Remove ductwork	1	LS	325.00	325.00	620.00	620.00	945.00
	Remove MEP items	1	LS	225.00	225.00	900.00	900.00	1,125.00
	Remove pendant fixture	255	LF	6.00	1,530.00	13.00	3,315.00	4,845.00
	Miscellaneous electrical demolition: remove equipment, wiring and associated conduit	1	LS	225.00	225.00	620.00	620.00	845.00
	Strip of built in millwork and the like (135 sf)	1	LS	1,400.00	1,400.00	2,600.00	2,600.00	4,000.00
	Take up and cart away existing carpet, adhesive and associated sundries ( <b>drawing shows floor tile</b> )	4,386	SF	2.00	8,772.00	3.00	13,158.00	21,930.00
	Take down and cart away stairs and make good	2.0	FLT	325.00	650.00	620.00	1,240.00	1,890.00
	Localised removal of terracotta wall tiles to enable installation of new structural elements of stairs	1	LS	225.00	225.00	900.00	900.00	1,125.00
	Demolition of existing dump waiter shaft	1	LS	225.00	225.00	620.00	620.00	845.00
	Take up floor tiles from restrooms and make good slab to receive new finish	23	SF	2.00	46.00	4.00	92.00	138.00
	Localized demolition of ceiling, walls for installation of new ductwork and make good (3 loc)	1	LS	60.00	60.00	150.00	150.00	210.00

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: L NEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
024119	Remove existing column encasement; ensuring no damage to existing columns and protect until new encasements have been installed. Approximate height of column	3	EA	325.00	975.00	1,280.00	3,840.00	4,815.00
	Protect existing historic fireplace throughout the duration of the work	1	LS	150.00	150.00	180.00	180.00	330.00
	Demolition of existing masonry riser shaft	1	LS	275.00	275.00	620.00	620.00	895.00
	<b>Third Floor</b>							
	Remove existing single door & frame	7	EA	58.00	406.00	325.00	2,275.00	2,681.00
	Remove CMU/Drywall partition	114	LF	35.00	3,990.00	200.00	22,800.00	26,790.00
	Concrete slab opening: remove concrete slab & reinforcement	305	SF	3.00	915.00	8.00	2,440.00	3,355.00
	Sawcut existing concrete slab to be removed	117	LF	4.00	468.00	8.00	936.00	1,404.00
	Temporary shoring concrete slab - around opening	117	LF	16.00	1,872.00	30.00	3,510.00	5,382.00
	Remove existing beam	55	LF	12.00	660.00	35.00	1,925.00	2,585.00
	Temporary shoring concrete slab - below beam	55	LF	20.00	1,100.00	30.00	1,650.00	2,750.00
	Remove existing flooring @ area to be repair	960	SF	2.00	1,920.00	4.00	3,840.00	5,760.00
	Remove existing tile flooring @ toilets	49	SF	1.00	49.00	4.00	196.00	245.00
	Remove existing ceiling @ area to be repair	660	SF	3.00	1,980.00	5.00	3,300.00	5,280.00
	Remove existing toilet & associated piping	1	EA	25.00	25.00	90.00	90.00	115.00
	Remove existing lavatory & associated piping	1	EA	25.00	25.00	90.00	90.00	115.00
	Remove toilet accessories	1	LS	200.00	200.00	240.00	240.00	440.00
	Remove exg. Convectors (fin tube & cover) to be relocated	1	EA	55.00	55.00	275.00	275.00	330.00
	Remove ductwork	1	LS	200.00	200.00	625.00	625.00	825.00
	Remove MEP items	1	LS	200.00	200.00	625.00	625.00	825.00
	Miscellaneous electrical demolition: remove equipment, wiring and associated conduit	1	LS	200.00	200.00	625.00	625.00	825.00
	Localised removal of terracotta wall tiles to enable instalation of new structural elements of stairs	1	LS	200.00	200.00	1,200.00	1,200.00	1,400.00
	Demolition of existing masonry riser shaft	1	EA	200.00	200.00	625.00	625.00	825.00
	Demolition of existing masonry riser shaft	1	EA	200.00	200.00	625.00	625.00	825.00

Bidder: National Environmental Safety Company, Inc. Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
024119	Take down and cart away existing door, frame and architraves	1	EA	100.00	100.00	625.00	625.00	725.00	725.00
	Remove toilet accessories	1	LS	100.00	100.00	375.00	375.00	475.00	475.00
	Localized demolition of ceiling, walls for installation of new ductwork and make good	1	LS	100.00	100.00	425.00	425.00	525.00	525.00
	<b>Roof Level</b>								
	Remove existing access door and associated bulkhead	1	EA	300.00	300.00	600.00	600.00	900.00	900.00
	Concrete slab opening: remove concrete slab & reinforcement	63	SF	4.00	252.00	7.00	441.00	693.00	693.00
	Sawcut existing concrete slab to be removed	66	LF	2.00	132.00	7.00	462.00	594.00	594.00
	Temporary shoring concrete slab - around opening	66	LF	14.00	924.00	30.00	1,980.00	2,904.00	2,904.00
	Remove existing beam	16	LF	10.00	160.00	35.00	560.00	720.00	720.00
	Temporary shoring concrete slab - below beam remove	16	LF	14.00	224.00	30.00	480.00	704.00	704.00
	New pipe penetration for dunnage	8	EA	100.00	800.00	300.00	2,400.00	3,200.00	3,200.00
	Remove roof membrane system	75	SF	3.00	225.00	5.00	375.00	600.00	600.00
	Remove exhaust ductwork	20	LF	10.00	200.00	12.00	240.00	440.00	440.00
	Remove existing fan, disconnect and remove all existing switches, wiring and conduit associated	4	EA	100.00	400.00	300.00	1,200.00	1,600.00	1,600.00
	Remove existing condensing unit, disconnect and remove all existing switches, wiring and conduit associated	1	EA	195.00	195.00	1,337.00	1,337.00	1,532.00	1,532.00
	Temporary shoring concrete slab - around opening	70	LF	14.00	980.00	30.00	2,100.00	3,080.00	3,080.00
	Debris disposal	1	LS	200.00	200.00	1,500.00	1,500.00	1,700.00	1,700.00
	Miscellaneous demolition	100	SF	2.00	200.00	4.50	450.00	650.00	650.00
	<b>Subtotal</b>				<b>100,000.00</b>		<b>246,589.00</b>	<b>346,589.00</b>	<b>346,589.00</b>
028213	<b>Asbestos Abatement</b>								
	Cellar	1	LS	9,600.00	9,600.00	34,176.00	34,176.00	43,776.00	43,776.00
	Fist floor	1	LS	12,960.00	12,960.00	46,138.00	46,138.00	59,098.00	59,098.00
	Mezzanine	1	LS	3,360.00	3,360.00	11,962.00	11,962.00	15,322.00	15,322.00
	Second floor	1	LS	10,560.00	10,560.00	37,594.00	37,594.00	48,154.00	48,154.00

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	Third floor	1	LS	5,760.00	5,760.00	20,506.00	20,506.00	26,266.00
	Roof	1	LS	3,360.00	3,360.00	11,962.00	11,962.00	15,322.00
	<b>Subtotal</b>				<b>45,600.00</b>		<b>162,338.00</b>	<b>207,938.00</b>
030000	<b>Division 3 - Concrete</b>							
033000	<b>Cast-In-Place Concrete</b>							
	Repair concrete slab to receive new finish							
	Refinish slab on grade - area of work (appx. 2,000 SF)	2,000	SF	1.00	2,000.00	3.50	7,000.00	9,000.00
	At ground floor	3,135	SF	1.00	3,135.00	3.50	10,972.50	14,107.50
	At second floor	4,386	SF	1.00	4,386.00	3.50	15,351.00	19,737.00
	At third floor	960	SF	1.00	960.00	3.50	3,360.00	4,320.00
	At roof level - repair concrete slab for pipe penetration	8	EA	50.00	400.00	265.00	2,120.00	2,520.00
	Stair 1: finishes (636 SF)	1	LS	962.00	962.00	5,355.00	5,355.00	6,317.00
	Concrete slab core drill @ first floor - electrical outlets	14	EA	50.00	700.00	200.00	2,800.00	3,500.00
	Concrete slab repair around opening							
	basement at elevator shaft	29	LF	4.00	116.00	6.50	188.50	304.50
	ground floor	216	LF	4.00	864.00	6.50	1,404.00	2,268.00
	second floor	120	LF	4.00	480.00	6.50	780.00	1,260.00
	third floor	106	LF	4.00	424.00	6.50	689.00	1,113.00
	roof level - new mechanical & elevator shaft	66	LF	4.00	264.00	6.50	429.00	693.00
	Concrete sidewalk at ramp	328	SF	5.00	1,640.00	13.00	4,264.00	5,904.00
	3 1/4" concrete fill (see decking in steel)							
	At ground floor	612	SF	3.00	1,836.00	10.00	6,120.00	7,956.00
	At second floor	243	SF	3.00	729.00	10.00	2,430.00	3,159.00
	At third floor	243	SF	3.00	729.00	10.00	2,430.00	3,159.00
	At roof level	38	SF	3.00	114.00	10.00	380.00	494.00
	Infill shaft opening w/new slab & metal deck							
	At second floor	27	SF	3.00	81.00	10.00	270.00	351.00
	At third floor	27	SF	3.00	81.00	10.00	270.00	351.00

NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation  
 Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.  
 FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	At roof at access door removed & others	33	SF	3.00	99.00	10.00	330.00	10.00	429.00
	<b>Subtotal</b>				<b>20,000.00</b>		<b>66,943.00</b>		<b>86,943.00</b>
033300	Architectural Cast In Place Concrete - included in 0333000								
035300	Concrete Floor Topping								
	Premium raised slab on low slab: 3" min. LW concrete, concrete ribs, wwm reinf., high density extruded polysterene @ ground floor	275	SF	13.00	3,575.00	37.00	10,175.00	37.00	13,750.00
	<b>Subtotal</b>				<b>3,575.00</b>		<b>10,175.00</b>		<b>13,750.00</b>
035416	Cement Leveling Compound - included in 033300								
4000	Division 4 - Masonry								
040100	Masonry Restoration and Cleaning								
	Front façade & entrance								
	Repair front façade due door change	1	LS	1,000.00	1,000.00	3,500.00	3,500.00	3,500.00	4,500.00
	Rear façade								
040100	Repair rear façade due to window change	1	LS	2,000.00	2,000.00	5,000.00	5,000.00	5,000.00	7,000.00
	Clean existing bluestone window header	30	LF	1.00	30.00	6.00	180.00	6.00	210.00
	New window sill to match existing header	30	LF	65.00	1,950.00	140.00	4,200.00	140.00	6,150.00
	<b>Subtotal</b>				<b>4,980.00</b>		<b>12,880.00</b>		<b>17,860.00</b>
042000	Unit Masonry								
	Interior CMU								
	Type 8: 6" cmu								
	at cellar	450	SF	13.00	5,850.00	53.00	23,850.00	53.00	29,700.00
	at first floor	673	SF	13.00	8,749.00	53.00	35,669.00	53.00	44,418.00
	at second floor	673	SF	13.00	8,749.00	53.00	35,669.00	53.00	44,418.00

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	at third floor	509	SF	13.00	6,617.00	53.00	26,977.00	33,594.00
	<b>Subtotal</b>				<b>29,965.00</b>		<b>122,165.00</b>	<b>152,130.00</b>
	<b>Division 5 - Metals</b>							
051200	<b>Structural Steel</b>							
	Steel frame & connections							
	at ground floor and basement	8,198	LBS	3.50	28,693.00	3.50	28,693.00	57,386.00
	at mezzanine	1,212	LBS	3.50	4,242.00	3.50	4,242.00	8,484.00
	at second floor	5,158	LBS	3.50	18,053.00	3.50	18,053.00	36,106.00
	at third floor	3,605	LBS	3.50	12,617.50	3.50	12,617.50	25,235.00
	at roof level	2,000	LBS	3.50	7,000.00	3.50	7,000.00	14,000.00
	Bearing beam pocket wall, 1" thick non-shrink grout @ steel frame							
	at basement: existing steel beam to be resupported on new concrete wall w/BP at basement	2	EA	40.00	80.00	80.00	160.00	240.00
	at ground floor	11	EA	40.00	440.00	80.00	880.00	1,320.00
	at mezzanine	2	EA	40.00	80.00	80.00	160.00	240.00
	at second floor	12	EA	40.00	480.00	80.00	960.00	1,440.00
	at third floor	8	EA	40.00	320.00	80.00	640.00	960.00
	at roof level	2	EA	40.00	80.00	80.00	160.00	240.00
	Elevator rail support HSS 8x6x1/4"							
	at first, mezzanine, second & third floor	82	LF	75.00	6,150.00	75.00	6,150.00	12,300.00
	HSS wall post - HSS 10x4x3/8" (32.58 #/lf) steel stair support anchors to wall							
	at first floor	72	LF	110.00	7,920.00	110.00	7,920.00	15,840.00
	at second floor	72	LF	110.00	7,920.00	110.00	7,920.00	15,840.00
	at third floor	26	LF	110.00	2,860.00	110.00	2,860.00	5,720.00
	Steel connection of new beam w/existing (cut concrete encasement and patch as required) @ ground floor							

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: L NEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
051200	at ground floor and basement	16	EA	20.00	320.00	80.00	1,280.00	1,600.00
	at mezzanine	1	EA	20.00	20.00	80.00	80.00	100.00
	at second floor	20	EA	20.00	400.00	80.00	1,600.00	2,000.00
	at roof level	11	EA	20.00	220.00	80.00	880.00	1,100.00
	3/4" shear studs							
	at ground floor	259	EA	4.00	1,036.00	6.00	1,554.00	2,590.00
	at mezzanine		EA					
	at second floor		EA					
	at third floor	18	EA	4.00	72.00	6.00	108.00	180.00
	Shelf angle 6x4x3/8" & anchor bolt bearing wall for floor support/existing beam to support new floor							
	at ground floor	6	LF	50.00	300.00	60.00	360.00	660.00
	at second floor	17	LF	50.00	850.00	60.00	1,020.00	1,870.00
	at third floor	17	LF	50.00	850.00	60.00	1,020.00	1,870.00
	Existing beam to be reinforced w/welded steel WT: remove existing concrete encasement, applied fireproofing, concrete encasement							
	at second floor	29	LF	75.00	2,175.00	75.00	2,175.00	4,350.00
	at third floor	13	LF	75.00	975.00	75.00	975.00	1,950.00
	Steel dunnage for mechanical equipment							
	Steel frame & connections (galvanized steel)							
	at AHU - 1	1,050	LBS	3.00	3,150.00	3.00	3,150.00	6,300.00
	at AHU - 2	1,275	LBS	3.00	3,825.00	3.00	3,825.00	7,650.00
	<b>Subtotal</b>				<b>111,128.50</b>		<b>116,442.50</b>	<b>227,571.00</b>
053100	<b>Steel Decking</b>							
	2" thick metal deck, 20 ga							
	at ground floor and basement	620	SF	7.50	4,650.00	7.50	4,650.00	9,300.00
	at second floor	264	SF	7.50	1,980.00	7.50	1,980.00	3,960.00

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	at third floor and roof	303	SF	7.50	2,272.50	7.50	2,272.50	7.50	2,272.50
	<b>Subtotal</b>				<b>8,902.50</b>			<b>8,902.50</b>	<b>17,805.00</b>
055000	<b>Miscellaneous Metals</b>								
	Exterior wall bracing	1	LS	1,000.00	1,000.00	2,000.00	2,000.00	2,000.00	3,000.00
	10"x4"x3/8" thick HSS 932.58 #/lf steel stair support anchors to wall	34	LF	100.00	3,400.00	100.00	3,400.00	3,400.00	6,800.00
	12"x4"x5/8" thick HSS tube stringer - intumescent painting	168	LF	200.00	33,600.00	200.00	33,600.00	33,600.00	67,200.00
	10"x4"x5/8" thick HSS tube at landing - intumescent painting	240	LF	175.00	42,000.00	175.00	42,000.00	42,000.00	84,000.00
	Miscellaneous steel & supports	1	LS	1,000.00	1,000.00	2,000.00	2,000.00	2,000.00	3,000.00
	<b>Subtotal</b>				<b>81,000.00</b>			<b>83,000.00</b>	<b>164,000.00</b>
055800	<b>Perimeter Heating/Cooling Enclosure</b>								
	Radiator cover	100	LF	75.00	7,500.00	50.00	5,000.00	5,000.00	12,500.00
	<b>Subtotal</b>				<b>7,500.00</b>			<b>9,900.00</b>	<b>17,400.00</b>
055100	<b>Steel Pan stairs</b>								
	Stair 1: Steel pan welded to stringer stair w/concrete pan infill & cast iron nosing integral w/steel pan stair construction		LR						
	basement thru first floor		LF						
	wall railin, stl railing								
	Stair 1: Steel pan welded to stringer (continous HSS section) stair w/concrete pan infill & cast iron nosing integral w/steel pan stair construction								
	first floor thru third floor		LR						
	<b>Subtotal</b>				<b>62,869.15</b>			<b>67,057.00</b>	<b>129,926.15</b>
057000	<b>Ornamental Metal - also included in 057010 &amp; 055100</b>								
	Metal display shelf at entry	12	LF	840.00	10,080.00	360.00	4,320.00	4,320.00	14,400.00
	<b>Subtotal</b>				<b>10,080.00</b>			<b>4,320.00</b>	<b>14,400.00</b>

Price is shown below

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
057010	Ornamental Glass Rail System								
	Stair railing								
	1/2" tempered w/continuous steel handrail @ stair		LF						
	Opening railings								
	42" high 1/2" thick glass guardrail - lobby stairs & ramp @ 1st flr		LF						
	1 1/2" SS handrail @ ramp		LF						
	at second floor		LF						
	at third floor		LF						
	<b>Subtotal</b>				75,000.00			50,000.00	125,000.00
057100	Decorative Metal Stairs - Included in 055100								
062000	Division 6 - Wood, Plastics and Composites								
	Carpentry								
	Miscellaneous wood blocking	1	LS	5,000.00	5,000.00	10,800.00	10,800.00	10,800.00	15,800.00
	<b>Subtotal</b>				5,000.00			10,800.00	15,800.00
064023	Architectural Woodwork								
	First floor								
	17'-3 7/8" display shelf, bamboo finish @ lobby	6	LF	350.00	2,100.00	225.00	1,350.00	3,450.00	3,450.00
	2'-6"x15'-0" main circulation desk # 1: bamboo finish, interior shelf, (2) SS pad/graphic, levelling mount	15	LF	350.00	5,250.00	225.00	3,375.00	8,625.00	8,625.00
	7'-4" ext. diam/3'-0" int. diam, 28" ht donut computer table: 1/2" corian & plywood revel black	2	EA	3,500.00	7,000.00	1,200.00	2,400.00	9,400.00	9,400.00
	2'-6"x15'-0" circulation desk # 2: bamboo finish, interior shelf, SS pad/graphic, leveling mount	15	LF	350.00	5,250.00	225.00	3,375.00	8,625.00	8,625.00
	3'-10"x10'-0" self service station: bambo finish, integrated display shelf w/1/4" glass cover, leveling mount	10	LF	460.00	4,600.00	250.00	2,500.00	7,100.00	7,100.00
	Second floor								

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	30" wide work table: work counter white matt formica attached to wall w/steel angles @ staff room	14	LF	350.00	4,900.00	225.00	3,150.00	8,050.00
	2'-6"x4'-8" self-service station: bamboo finish, leveling mount	5	LF	350.00	1,750.00	225.00	1,125.00	2,875.00
	2'-6"x8'-6" self-service station: bamboo finish, interior shelf, door, SS pad/graphics, levelling mount	16	LF	350.00	5,600.00	225.00	3,600.00	9,200.00
	7'-4" ext. diam/3'-0" int. diam, 28" ht donut computer table: 1/2" corian glacier white & plywood revel black	3	EA	3,500.00	10,500.00	1,200.00	3,600.00	14,100.00
	Third floor							
	30" wide base cabinet and 4" thick palm countertop @ staff lounge	11	LF	400.00	4,400.00	275.00	3,025.00	7,425.00
	Misc. Millwork	25	SF	350.00	8,750.00	225.00	5,625.00	14,375.00
	Vanity counter w/lav openings @ bathroom	15	LF	350.00	5,250.00	225.00	3,375.00	8,625.00
	<b>Subtotal</b>				<b>65,350.00</b>		<b>36,500.00</b>	<b>101,850.00</b>
	<b>Division 7 - Thermal and Moisture Protection</b>							
071610	Capillary Waterproofing - included in other sections							
075500	Modified Bitumen Roofing							
	Patch w/existing material around roof opening for mechanical and elevator shaft	150	LF	15.00	2,250.00	75.00	11,250.00	13,500.00
	Miscellaneous repair existing roof system	200	SF	15.00	3,000.00	75.00	15,000.00	18,000.00
	Roof Membrane (see Bid Booklet page 2a)	2	ROL	65.00	130.00	100.00	200.00	330.00
	<b>Subtotal</b>				<b>5,380.00</b>		<b>26,450.00</b>	<b>31,830.00</b>
076200	Sheet Metal Work - included in 075500							
077100	Roof Specialties and Accessories - included in 075500							
078100	Sprayed Fire Resistive Material							
	spray fireproofing: steel frame & MD							



## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: L NEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	2'-0"x2'-0" 2hr rated access panels @ SECOND floor - slab - FSD	3	EA	300.00	900.00	500.00	1,500.00	2,400.00
	<b>Subtotal</b>				<b>50,100.00</b>		<b>75,800.00</b>	<b>125,900.00</b>
084228	<b>All Glass Doors and partitions</b>							
	Interior glass partition @ vestibule	200	SF	125.00	25,000.00	75.00	15,000.00	40,000.00
	5'-6" high, 1/2" thick glass partition @ ground floor	20	LF	730.00	14,600.00	390.00	7,800.00	22,400.00
	3'-0"x5'-6" powdercoated aluminum gate @ ground floor	1	EA	2,500.00	2,500.00	1,500.00	1,500.00	4,000.00
	<b>Subtotal</b>				<b>42,100.00</b>		<b>24,300.00</b>	<b>66,400.00</b>
085200	<b>Exterior Wood Windows and Doors</b>							
	Front façade							
	Clean existing windows - second & third floors	459	SF	1.00	459.00	6.00	2,754.00	3,213.00
	Clean existing storefront - ground floor	257	SF	1.00	257.00	6.00	1,542.00	1,799.00
	Rear façade							
	New exterior window IGU - 1/4" low E inboard - 1/4" lam. Outboard & ptd HD wood frame, sealed & caulking @ ground level	78	SF	4.00	312.00	12.00	936.00	1,248.00
	Clean existing storefront - cellar	168	SF	1.00	168.00	6.00	1,008.00	1,176.00
	Clean existing windows - second & third floors	218	SF	1.00	218.00	6.00	1,308.00	1,526.00
	Exterior Doors							
	2 - 3'-1"x9'-0" glazed ptd mahogany doors @ main entrance	1	PR	4,000.00	4,000.00	5,000.00	5,000.00	9,000.00
	Signage pouch mounted to inside surface of glass	1	EA	500.00	500.00	100.00	100.00	600.00
	6'x8' insulated glass panel/metal frame, double - vestibule	1	PR	2,500.00	2,500.00	3,000.00	3,000.00	5,500.00
	Clean existing door header & signage - protect from damage	10	LF	2.00	20.00	12.00	120.00	140.00
	Install new granite threshold	1	EA	400.00	400.00	700.00	700.00	1,100.00
	<b>Subtotal</b>				<b>8,834.00</b>		<b>16,468.00</b>	<b>25,302.00</b>
087100	<b>Finish Hardware</b>							
	1" diam. Aluminum push/pull handles		EA				Price included with doors	
	<b>Subtotal</b>							

DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation  
Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.  
FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Total Cost
088000	Glass and Glazing - included in 084228 & 085200								
089000	Louvers and Vents: The louvers are detail with plumbing and HVAC sections								
090120	Division 9 - Finishes Plaster Restoration Ceiling								
	C1 - Patch & repair existing plaster ceiling as required, paint sprayed		SF						
	Miscellaneous ceiling at existing areas		LS						
	Molding at ceiling, paint		LF						
	Relocation of HW piping above ceiling at first floor windows								
	Patch existing ceiling, paint		LF						
	Plaster moulding at ceiling, paint		LF						
	<b>Subtotal</b>				5,000.00			35,000.00	40,000.00
092713	Glass - Fiber - Reinforced Gypsum Fabrications New round column enclosure. Match adjacent columns finish, base, capitals, etc. @ first floor		EA						
	2'-6"x2'-6" GFRG: glass fiber reinforced gypsum ceiling access panel		EA						
	<b>Subtotal</b>								
092900	Gypsum Drywall Cellar								
	Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides		SF						
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side		SF						
	Type 4: 3-5/8" mtl studs, two layers 5/8" gwb type X both sides -2hr.		SF						
	Furring: mtl studs, 5/8" gwb @ cmu walls		SF						
	Miscellaneous repair partition at existing		LS						

Price is shown below

Price included in gypsum bord assemblies

Total 26,500 SF of gypsum board wall, ceiling, soffit, and duct enclosure for entire work. Price is shown below.

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	Ceiling							
	C2 - 5/8" gwb ceiling		SF					
092900	Ground floor							
	Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides		SF					
	Type 1A: 3-5/8" mtl studs, one layer 5/8" gwb both sides, continuous batt insulation		SF					
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side		SF					
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side - soffit		LF					
	Type 4: 3-5/8" mtl studs, two layers 5/8" gwb type X both sides -2hr.		SF					
	Furring: mtl studs, 5/8" gwb @ cmu walls		SF					
	Column furring: refurbish existing		EA					
	Miscellaneous repair partition at existing		LS					
	Second floor							
	Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides		SF					
	Type 1A: 3-5/8" mtl studs, one layer 5/8" gwb both sides, continuous batt insulation		SF					
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side		SF					
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side - soffit		LF					
	Type 4: 3-5/8" mtl studs, two layers 5/8" gwb type X both sides -2hr.		SF					
	Furring: mtl studs, 5/8" gwb @ cmu walls		SF					
	Column furring: refurbish existing		EA					
	Miscellaneous repair partition at existing		LS					
	Third floor							
	Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides		SF					
	Type 1A: 3-5/8" mtl studs, one layer 5/8" gwb both sides, continuous batt insulation		SF					
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side		SF					
	Type 4: 3-5/8" mtl studs, two layers 5/8" gwb type X both sides -2hr.		SF					

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Total Cost
092900	Furring: mtl studs, 5/8" gwb @ cmu walls		SF						
	Miscellaneous repair partition at existing		LS						
	Protection		LS						
	<b>Subtotal</b>				<b>35,000.00</b>			<b>227,512.00</b>	<b>262,512.00</b>
093013	<b>Ceramic Tiling</b>								
	Ceramic tile - wall	864	SF	8.00	6,912.00	22.00	19,008.00	25,920.00	
	Ceramic tile - floor	296	SF	8.00	2,368.00	22.00	6,512.00	8,880.00	
	Ceramic tile - cover base (included in wall tile)		LF						
	<b>Subtotal</b>				<b>9,280.00</b>			<b>25,520.00</b>	<b>34,800.00</b>
096400	<b>Wood Strip Flooring</b>								
	Wood flooring, white oak planks		SF						
	Miscellaneous flooring at existing areas		LF						
	<b>Subtotal</b>				<b>40,000.00</b>			<b>78,446.00</b>	<b>118,446.00</b>
096510	<b>Resilient Tile Flooring</b>								
	Rubber flooring - 24"x24"		SF						
	Rubber flooring - 24"x24" - Round Accent - premium		SF						
	<b>Subtotal</b>				<b>2,400.00</b>			<b>7,304.00</b>	<b>9,704.00</b>
096813	<b>Carpet Tile</b>								
	Carpet	2,124	SF	6.50	13,806.00	7.50	15,930.00	29,736.00	
	<b>Subtotal</b>				<b>13,806.00</b>			<b>15,930.00</b>	<b>29,736.00</b>
096816	<b>Carpet (Glue Down)</b>								
	Carpet	2,678	SF	6.50	17,407.00	7.50	20,085.00	37,492.00	
	<b>Subtotal</b>				<b>17,407.00</b>			<b>20,085.00</b>	<b>37,492.00</b>

Total 6,234 SF of wood flooring for entire project. Price shown below.

Total 586 SF of VCT flooring and 150 LF of rubber base for entire project. Price is shown below.

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Total Cost
097200	Wall Covering								
	Digitally printed custom wallpaper								
	at first floor	516	SF	10.00	5,160.00	15.00	7,740.00	12,900.00	
	at second floor	530	SF	10.00	5,300.00	15.00	7,950.00	13,250.00	
	<b>Subtotal</b>				<b>10,460.00</b>		<b>15,690.00</b>	<b>26,150.00</b>	
099000	Painting & Finishing								
	Ptd wall		SF						
	Ptd existing & new ceiling		SF						
	Miscellaneous ptd existing rooms		LS						
	Paint existing guardrail - exterior		LF						
	Repaint existing doors								
	at cellar		EA						
	at ground level - exterior (north elev.)		EA						
	at second floor - janitor's		EA						
	at third floor		EA						
	Repaint exterior windows @ front façade								
	second & third floors		SF						
	ground floor		SF						
	Rear façade								
	New exterior window including ptd, sealed & caulking @ ground level		SF						
	cellar		SF						
	second & third floors		SF						
	Seal concrete		SF						
	Existing floor to remain		SF						
	<b>Subtotal</b>				<b>10,000.00</b>		<b>70,000.00</b>	<b>80,000.00</b>	
099646	Intumescent Painting - In 05500								

Total 25,000 SF wall, 15000 SF wall, 25 doors, and other miscellaneous paint throughout the project. Price is shown below.

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Total Cost
101400	Division 10 - Specialties								
	Identifying Devices								
	Fixed Tackboards								
	Homasote tack board: 3/4" MDF or plywood, 1/4" forbo tack board, 1"x1/4" ptd wood trim, 1/8" & 1/16" revel								
	7'-0"x7'-0" @ first floor	2	EA	2,000.00	4,000.00	1,000.00	2,000.00	6,000.00	
	6'-9"x5'-6" @ second floor	1	EA	1,500.00	1,500.00	800.00	800.00	2,300.00	
	Interior signage								
	Basement	11	EA	200.00	2,200.00	100.00	1,100.00	3,300.00	
	Ground floor	13	EA	200.00	2,600.00	100.00	1,300.00	3,900.00	
	Second floor	11	EA	200.00	2,200.00	100.00	1,100.00	3,300.00	
	Third floor	6	EA	200.00	1,200.00	100.00	600.00	1,800.00	
	Front entrance								
	New 1'-0"x1'-9" bronze plaque	1	EA	750.00	750.00	500.00	500.00	1,250.00	
	New tamper resistant sign location for public hours	1	EA	200.00	200.00	100.00	100.00	300.00	
	54"x96" public notice board, MDF/FORBO w/wood trim @ lobby	1	EA	1,500.00	1,500.00	800.00	800.00	2,300.00	
	101								
	1'-1"x4'-5" brochure meam: 1/8" steel plate bolted to wood floor,								
	1/8" bent steel beam @ vestibule	6	LF	400.00	2,400.00	200.00	1,200.00	3,600.00	
	<b>Subtotal</b>				<b>18,550.00</b>		<b>9,500.00</b>	<b>28,050.00</b>	
102114	Toilet Partitions								
	Toilet Partition - Stainless Steel @ first floor	2	EA	2,000.00	4,000.00	1,500.00	3,000.00	7,000.00	
	Urinal partition - first floor	1	EA	750.00	750.00	500.00	500.00	1,250.00	
	<b>Subtotal</b>				<b>4,750.00</b>		<b>3,500.00</b>	<b>8,250.00</b>	
102213	Wire Mesh Partitions								
	Wire Mesh Partitions	8	LF	80.00	640.00	60.00	480.00	1,120.00	

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	Wire mesh Partition swing door	1	EA	1,500.00	1,500.00	1,500.00	1,500.00	3,000.00	3,000.00
	<b>Subtotal</b>				<b>2,140.00</b>		<b>1,980.00</b>	<b>4,120.00</b>	
102813	<b>Toilet Accessories</b>								
	Grab bar - 36"	4	EA	50.00	200.00	100.00	400.00	600.00	600.00
	Grab bar - 42"	4	EA	50.00	200.00	100.00	400.00	600.00	600.00
	Toilet paper dispenser - by owner		EA						
	Soap dispenser - by owner		EA						
	Paper towel dispenser/waste receptacle	3	EA	100.00	300.00	100.00	300.00	600.00	600.00
	Hand dryer, SS, wall mounted	4	EA	300.00	1,200.00	300.00	1,200.00	2,400.00	2,400.00
	Mirror, SS frame	27	SF	100.00	2,700.00	100.00	2,700.00	5,400.00	5,400.00
	Mop rack @ janitor	1	EA	100.00	100.00	100.00	100.00	200.00	200.00
	Robe hook	4	EA	100.00	400.00	100.00	400.00	800.00	800.00
	Baby changing station, SS, wall mounted	3	EA	500.00	1,500.00	400.00	1,200.00	2,700.00	2,700.00
	Trash cans		EA						
	<b>Subtotal</b>				<b>6,600.00</b>		<b>6,700.00</b>	<b>13,300.00</b>	
104416	<b>Fire Extinguisher &amp; Cabinets</b>								
		4	EA	700.00	2,800.00	500.00	2,000.00	4,800.00	4,800.00
	<b>Subtotal</b>				<b>2,800.00</b>		<b>2,000.00</b>	<b>4,800.00</b>	
	<b>Division 11 - Equipment</b>								
113100	<b>Appliances</b>								
	Staff pantry								
	Full height refrigerator	1	EA	1,000.00	1,000.00	500.00	500.00	1,500.00	1,500.00
	Microwave	1	EA	700.00	700.00	300.00	300.00	1,000.00	1,000.00
	<b>Subtotal</b>				<b>1,700.00</b>		<b>800.00</b>	<b>2,500.00</b>	

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
120000	Division 12 - Furnishings							
122413	Window Shades							
	front façade	500	SF	10.00	5,000.00	5.00	2,500.00	7,500.00
	rear façade	720	SF	10.00	7,200.00	5.00	3,600.00	10,800.00
	<b>Subtotal</b>				<b>12,200.00</b>		<b>6,100.00</b>	<b>18,300.00</b>
124813	Floor Mats and Frames							
	First floor							
	Metal grating walk-off matt-entrance	110	SF	35.00	3,850.00	10.00	1,100.00	4,950.00
	Second floor							
	12"wx96"ht aluminum EZ-shelving (5 shelves)	60	LF	20.00	1,200.00	10.00	600.00	1,800.00
	<b>Subtotal</b>				<b>5,050.00</b>		<b>1,700.00</b>	<b>6,750.00</b>
142423	Division 14 - Conveying System							
	Hydraulic Passenger Elevator							
	Passenger Elev. 3,500 lbs, 4 stops (front doors)		EA					
	Cabin upgrade		EA					
	<b>Subtotal</b>				<b>200,000.00</b>		<b>75,000.00</b>	<b>275,000.00</b>
	Division 21 - Fire Suppression							
210500	Common Work Results for Fire Suppression - included in 211300							
211313	Wet-Pipe-Sprinkler Systems							
	Sprinkler heads							
	at cellar	52	EA	326.00	16,952.00	760.00	39,520.00	56,472.00
211313	Piping:							
	4" galvanized steel piping, Sch 40, incoming service - F	5	LF	64.00	320.00	148.00	740.00	1,060.00
	4" F - connection w/existing incoming service	1	EA	392.00	392.00	917.00	917.00	1,309.00
	4" black steel piping, Sch 40, Sp	5	LF	64.00	320.00	148.00	740.00	1,060.00

Price is shown below.

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	2-1/2" black steel piping, Sch 40	20	LF	32.00	640.00	82.00	1,640.00	2,280.00	
	2" black steel piping, Sch 41	100	LF	30.00	3,000.00	75.00	7,500.00	10,500.00	
	1-1/2" black steel piping, Sch 42	60	LF	22.00	1,320.00	51.00	3,060.00	4,380.00	
	1-1/4" black steel piping, Sch 43	70	LF	20.00	1,400.00	46.00	3,220.00	4,620.00	
	1" black steel piping, Sch 44	150	LF	32.00	4,800.00	75.00	11,250.00	16,050.00	
	2"/1" drain galvanized steel piping, Sch 45	1	LS	694.00	694.00	1,620.00	1,620.00	2,314.00	
	4" capped outlet	2	EA	159.00	318.00	370.00	740.00	1,058.00	
	4" DCVA single	1	EA	2,100.00	2,100.00	4,920.00	4,920.00	7,020.00	
	4" OS & Y valve	1	EA	463.00	463.00	1,080.00	1,080.00	1,543.00	
	4" alarm check valve assembly	1	EA	1,322.00	1,322.00	3,086.00	3,086.00	4,408.00	
	4" floor control assembly w/2 -1/2" butterfly valve, flow switch & 1" drain assembly w/inspector test valve	1	EA	1,408.00	1,408.00	3,285.00	3,285.00	4,693.00	
	4" check valve, ABD	1	EA	467.00	467.00	1,089.00	1,089.00	1,556.00	
	Tamper switch	3	EA	542.00	1,626.00	1,263.00	3,789.00	5,415.00	
	Inspector's test connection	1	EA	317.00	317.00	740.00	740.00	1,057.00	
	Hanger & seismic bracing	1	LS	200.00	200.00	467.00	467.00	667.00	
	Fire department connection	1	EA	1,680.00	1,680.00	3,932.00	3,932.00	5,612.00	
	Miscellaneous fire protection	1	LS	317.00	317.00	740.00	740.00	1,057.00	
	Allow for testing	1	LS	467.00	467.00	1,089.00	1,089.00	1,556.00	
	Allow for supervision	1	LS	467.00	467.00	1,089.00	1,089.00	1,556.00	
	<b>Subtotal</b>				<b>40,990.00</b>		<b>96,253.00</b>	<b>137,243.00</b>	
220000	<b>Division 22 - Plumbing</b>								
220500	<b>Common Work Results for Plumbing &amp; 4" fire service &amp; firestopping</b>	1	LS	13,000.00	13,000.00	22,600.00	22,600.00	35,600.00	
220516	<b>Expansion Fitting and Loops for Plumbing Piping - included in other sections</b>								
220519	<b>Meter and Gauges for Plumbing Piping - included other sections</b>								
220523	<b>General-Duty Valves for Plumbing Piping - included in other sections</b>								
220529	<b>Hanger and Supports for Plumbing Piping and Equipment - included in 221316, 22113, and other sections</b>								

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Labor Cost
220548	Vibration and Sismic Controls for Plumbing Piping and Equipment - included in 221316, 22113 and other sections								
220553	Identification for Plumbing Piping and Equipment - included in 221316, 22113 and other sections								
220700	Plumbing Insulation								
	Insulation (CW & HW)								
	Water piping 1-1/2"	220	LF	2.15	473.00	8.60	1,892.00	2,365.00	
	Water piping 1-1/4"	50	LF	2.15	107.50	8.40	420.00	527.50	
	Water piping 1"	150	LF	2.00	300.00	8.40	1,260.00	1,560.00	
	Water piping 3/4"	500	LF	1.50	750.00	7.80	3,900.00	4,650.00	
	Water piping 1/2"	70	LF	1.40	98.00	7.70	539.00	637.00	
	<b>Subtotal</b>				<b>14,728.50</b>		<b>30,611.00</b>	<b>45,339.50</b>	
221113	Facility Water Distribution Piping - included in 221116								
221116	Domestic Water Piping								
	CW								
	Water piping 2"	55	LF	99.00	5,445.00	46.00	2,530.00	7,975.00	
	Water piping 1-1/2"	165	LF	60.00	9,900.00	37.00	6,105.00	16,005.00	
	Water piping 1-1/4"	50	LF	28.00	1,400.00	35.00	1,750.00	3,150.00	
	Water piping 1"	150	LF	22.00	3,300.00	32.00	4,800.00	8,100.00	
	Water piping 3/4"	500	LF	20.00	10,000.00	30.00	15,000.00	25,000.00	
	Water piping 1/2"	70	LF	16.00	1,120.00	29.00	2,030.00	3,150.00	
221116	Water pipe fittings								
	Valve, 2"		LS						Included with piping above
	Valve, 1-1/2" and 1-1/4"		EA						Included with piping above
	Valve, 3/4"		EA						Included with piping above
	Valve, 1/2"		EA						Included with piping above
	Connect to existing		EA						Included with piping above
	Connect to existing (Main)		EA						Included with piping above

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Labor Cost
	HW								
	Hot Water Piping, 1"		LF				Included with piping above		
	Hot Water Piping, 3/4"		LF				Included with piping above		
	Hot Water Piping, 1/2"		LF				Included with piping above		
	Valve, 1"		EA				Included with piping above		
	Valve, 3/4"		EA				Included with piping above		
	Connect to existing		EA				Included with piping above		
	<b>Subtotal</b>				<b>31,165.00</b>			<b>32,215.00</b>	<b>63,380.00</b>
221119	<b>Domestic Water Piping Specialties</b>								
	SA-3/4" shock absorber	5	EA	83.00	415.00	39.00	195.00		610.00
	Miscellaneous access door for isolation valve	1	LS				By others		
	Domestic water meter	1	EA	3,345.00	3,345.00	2,118.00	2,118.00		5,463.00
	2" DCVA	1	EA	3,685.00	3,685.00	2,200.00	2,200.00		5,885.00
	2" OS & Y valve		EA				Included with meter		
	<b>Subtotal</b>				<b>7,445.00</b>			<b>4,513.00</b>	<b>11,958.00</b>
221316	<b>Sanitary Waste and Vent Piping</b>								
	DWV Piping								
	DWV Piping above grade, 6"	25	LF	44.00	1,100.00	61.00	1,525.00		2,625.00
	DWV Piping above grade, 4"	290	LF	33.00	9,570.00	51.00	14,790.00		24,360.00
	DWV Piping above grade, 3"	130	LF	28.00	3,640.00	44.00	5,720.00		9,360.00
	DWV Piping above grade, 2" & 1-1/2"	300	LF	22.00	6,600.00	42.00	12,600.00		19,200.00
	DWV Pipe fittings	1	LS				Included with piping above		
221316	DWV Pipe fittings, 3" - T, Ty		EA				Included with piping above		
	DWV Pipe fittings, 2" & 1-1/2" - T, TY		EA				Included with piping above		
	DWV Pipe fittings, 2" & 1-1/2" - 90		EA				Included with piping above		
	Fresh Air Inlet		EA				Included with piping above		

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Total Cost
	Cleanout - 4" S		EA					Included with piping above	
	Cleanout - 3" S		EA					Included with piping above	
	Cleanout - 2-1/2" S		EA					Included with piping above	
	Floor drain, 3"	3	EA	204.00	612.00	154.00	462.00	1,074.00	
	Floor drain, 3" @ toilet - second floor	2	EA	204.00	408.00	154.00	308.00	716.00	
	Vent Through Roof, 4"	2	EA	105.00	210.00	303.00	606.00	816.00	
	Cap, 6"		EA					Included with piping above	
	Trap Primer	5	EA	66.00	330.00	94.00	470.00	800.00	
	Connect to Existing (Main)	1	EA	100.00	100.00	500.00	500.00	600.00	
	Vent								
	DWV Piping above grade, 4"		LF					Included with piping above	
	DWV Piping above grade, 2" & 1-1/2"		LF					Included with piping above	
	Connect to Existing (Main)	1	EA	100.00	100.00	500.00	500.00	600.00	
	Allow discharge sump pump piping	1	LS	385.00	385.00	1,540.00	1,540.00	1,925.00	
	<b>Subtotal</b>				<b>23,055.00</b>		<b>39,021.00</b>	<b>62,076.00</b>	
221319	Sanitary Waste Piping Specialties - included in 221316								
221429	Sump Pumps								
	Elevator sump pump	1	EA	5,638.00	5,638.00	2,310.00	2,310.00	7,948.00	
	<b>Subtotal</b>				<b>5,638.00</b>		<b>2,310.00</b>	<b>7,948.00</b>	
223400	Plumbing Equipment								
	Expansion Tank, 8 gallon		EA						
	Hot Water recirculation pump, 1/8 hp with aqua stat		EA						
	<b>Subtotal</b>								
224000	Plumbing Fixtures								
	(Included Rough in)								

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	Water Closets w/flushometer	5	EA	876.00	4,380.00	453.00	2,265.00	6,645.00	
	Lavatories, wall hung	6	EA	605.00	3,630.00	605.00	3,630.00	7,260.00	
	Urinals w/flushometer, wall mounted	1	EA	825.00	825.00	453.00	453.00	1,278.00	
	Janitor sink	2	EA	2,585.00	5,170.00	605.00	1,210.00	6,380.00	
	Pantry sink, SS	1	EA	506.00	506.00	605.00	605.00	1,111.00	
	Pantry sink, SS - to be reinstalled (3rd floor)	1	EA	83.00	83.00	303.00	303.00	386.00	
	<b>Subtotal</b>				<b>14,594.00</b>		<b>8,466.00</b>	<b>23,060.00</b>	
224700	<b>Drinking Fountains and Water Coolers</b>								
	Water fountain, wall hung	1	EA	3,410.00	3,410.00	1,086.00	1,086.00	4,496.00	
	Bottle filling station - 1st floor	1	EA	3,190.00	3,190.00	715.00	715.00	3,905.00	
	Bottle filling station - 2nd floor	1	EA	3,410.00	3,410.00	1,086.00	1,086.00	4,496.00	
	<b>Subtotal</b>				<b>10,010.00</b>		<b>2,887.00</b>	<b>12,897.00</b>	
230000	<b>DIVISION 23 - Heating Ventilating and Air Conditioning</b>								
230110	<b>Basic Mechanical &amp; Methods - included in other sections</b>								
230120	<b>Seismic - included in other sections</b>								
230500	<b>Common Work Results for HVAC</b>								
	<b>Misc, HVAC</b>								
	Temporary heat	1	LS	6,000.00	6,000.00	4,000.00	4,000.00	10,000.00	
	Sleeve through wall & slab	1	LS		Included in general construction				
	Rigging of HVAC equipment	1	LS	4,400.00	4,400.00	6,600.00	6,600.00	11,000.00	
	Fire stopped and sealed where required	1	LS	1,650.00	1,650.00	4,400.00	4,400.00	6,050.00	
	Pitch pocket & flashing for gas riser at roof		EA			Included in roofing			
	Pitch pocket & flashing for dunnage post		EA			Included in roofing			
	Pitch pocket at ductwork support & base plate		EA			Included in roofing			
	<b>Subtotal</b>				<b>12,050.00</b>		<b>15,000.00</b>	<b>27,050.00</b>	

NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation  
 Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.  
 FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
230513	Common Motor Requirements for HVAC Equipment Motors - included in other sections							
230523	General-Duty Valves for HVAC Piping - included in other items							
230529	Hangers & Supports for HVAC Piping and Equipment - included in other sections							
230548	Vibration and Seismic Controls for HVAC Piping and Equipment - included in other sections							
230553	Identification for HVAC Piping and Equipment - included in other sections							
230593	Testing, Adjusting, Balancing for HVAC Testing and Balancing	1	LS	0.00	0.00	5,500.00	5,500.00	5,500.00
	<b>Subtotal</b>				<b>0.00</b>	<b>5,500.00</b>	<b>5,500.00</b>	<b>5,500.00</b>
230700	<b>HVAC Insulation</b>							
	Insulation (CW & HW)							
	Water piping, 1"	1,122	LF	2.75	3,085.50	6.30	7,068.60	10,154.10
	Water piping, 3/4"		LF				Included above piping	
	Relocation of HW piping above ceiling at first floor windows							
	Insulation (CW & HW)							
	Water piping, 1"		LF				Included with piping above	
	Water piping, 3/4"		LF				Included with piping above	
	Duct insulation	6,942	SF	1.10	7,636.20	2.20	15,272.40	22,908.60
	Exterior duct insulation & support		SF				Included in below item	
	2" Exterior rigid foam board insulation	1,122	SF	3.85	4,319.70	4.40	4,936.80	9,256.50
	2 hr duct wrap		SF				Included in general construction in gypsum board assemblies	
	<b>Subtotal</b>				<b>15,041.40</b>		<b>27,277.80</b>	<b>42,319.20</b>
230900	<b>Automatic Temperature Control and Sequence of Operation</b>							
	Thermostat and wiring	6	EA	220.00	1,320.00	1,100.00	6,600.00	7,920.00
	CO2 and wiring	6	EA	275.00	1,650.00	1,100.00	6,600.00	8,250.00
	Webstat Thermostat (Honeywell T7350H1009) Material only (see Bid Booklet page 2b)	3	EA					

Material cost includes in allowance and installation cost is negligible

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	Web Stat Controller (Honeywell W7530A1000) Material only (see Bid Booklet page 2b)	1	EA					
	Controls	1	LS	6,600.00	6,600.00	27,500.00	27,500.00	34,100.00
	<b>Subtotal</b>				<b>9,570.00</b>		<b>40,700.00</b>	<b>50,270.00</b>
230093	Sequence of Operation - included in 230900							
231123	Facility Natural Gas Piping							
	Gas piping, 2-1/2"	210	LF	32.00	6,720.00	66.00	13,860.00	20,580.00
	Gas piping, 3/4"	5	EA	35.00	175.00	29.00	145.00	320.00
	Gas pipe fittings		EA				Included with piping above	
	Gas plug, 3/4"		EA				Included with piping above	
	2-1/2" gas riser in WP pitch pocket @ roof	1	EA	215.00	215.00	231.00	231.00	446.00
	Gas cap, 2-1/2"		EA				Included with piping above	
	Gas cap, 3/4"		EA				Included with piping above	
	Connection to existing pipe, 2-1/2"		EA				Included with piping above	
	Connection to equipment		EA				Included with piping above	
	HVAC Piping							
	Refrigeration piping	300	LF	11.20	3,360.00	23.65	7,095.00	10,455.00
	Charging refrigerant	1	LS	1,100.00	1,100.00	2,200.00	2,200.00	3,300.00
	Hot Water Piping							
	Disconnect HW Convectors	1	EA	0.00	0.00	9,900.00	9,900.00	9,900.00
	Hot Water Pipe, 1"	713	LF	11.00	7,843.00	22.00	15,686.00	23,529.00
	Hot Water Pipe, 3/4"		LF				Included with piping above	
	Valve, 1"		EA				Included with piping above	
	Valve, 3/4"		EA				Included with piping above	
	Relocation of HW piping above ceiling at first floor windows							
	Disconnect HW Convectors		EA				Included HW convector disconnection above	

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	Hot Water Pipe, 1"		LF					Included with piping above
	Hot Water Pipe, 3/4"		LF					Included with piping above
	1" 90 elbow		EA					Included with piping above
	1"x3/4" T		EA					Included with piping above
	3/4" elbow		EA					Included with piping above
	Hot water Pipe fittings		LS					Included with piping above
	Connection existing convector including valve	3	EA	165.00	495.00	3,300.00	9,900.00	10,395.00
	Connection existing piping	3	EA	110.00	330.00	2,090.00	6,270.00	6,600.00
	Hot water Pipe fittings		LS					Included with above items
	Connections to existing piping		EA					Included with above items
	Connection to equipment							
	HV unit	1	EA	330.00	330.00	3,300.00	3,300.00	3,630.00
	CUH - 1	1	EA	220.00	220.00	3,300.00	3,300.00	3,520.00
	Radiator	7	EA	110.00	770.00	1,320.00	9,240.00	10,010.00
	Mini Split System, refrigerant	3	EA	550.00	1,650.00	7,700.00	23,100.00	24,750.00
	Radiator Control Valve	7	EA	550.00	3,850.00	550.00	3,850.00	7,700.00
	<b>Subtotal</b>				<b>27,058.00</b>		<b>108,077.00</b>	<b>135,135.00</b>
232123	<b>Hydronic Pumps</b>							
	Condensate pumps 1/3	2	EA	330.00	660.00	495.00	990.00	1,650.00
	<b>Subtotal</b>				<b>660.00</b>		<b>990.00</b>	<b>1,650.00</b>
233113	<b>Metal Ducts</b>							
	Supply/Return Ductwork	12,100	Lbs	4.95	59,895.00	6.05	73,205.00	133,100.00
	Supply Ductwork - round	850	Lbs	4.95	4,207.50	5.50	4,675.00	8,882.50
	Supply, exhaust, OSA and Return Duct		Lbs					Included with above two items
	Flexible connection	50	LF	3.85	192.50	16.50	825.00	1,017.50
	Ductwork connection w/existing	2	EA	27.50	55.00	137.50	275.00	330.00

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Total Cost
	Provide gooseneck 10x6		EA		This item not found in the drawing		This item not found in the drawing		
	<b>Subtotal</b>				<b>64,350.00</b>		<b>78,980.00</b>		<b>143,330.00</b>
233300	<b>Air Duct Accessories</b>								
	Hood for power exhaust discharge	2	EA	660.00	1,320.00	880.00	1,760.00		3,080.00
	FSD less than 2 SF		EA		This item not found in the drawing		This item not found in the drawing		
	FSD 2 SF to 3 SF		EA		This item not found in the drawing		This item not found in the drawing		
	FSD 3 SF to 4 SF	16	EA	660.00	10,560.00	550.00	8,800.00		19,360.00
	FSD 4 SF to 5 SF		EA		This item not found in the drawing		This item not found in the drawing		
	Duct accessories	1	LS	11,000.00	11,000.00	27,500.00	27,500.00		38,500.00
	Provide barometric relief damper at gooseneck		EA		This item not found in the drawing		This item not found in the drawing		
	Motorized damper at elevator smoke shaft	5	EA	880.00	4,400.00	1,100.00	5,500.00		9,900.00
	<b>Subtotal</b>				<b>27,280.00</b>		<b>43,560.00</b>		<b>70,840.00</b>
233423	<b>HVAC Power Ventilators</b>								
	Power exhaust for RTU-1 and RTU-2	2	EA	4,400.00	8,800.00	880.00	1,760.00		10,560.00
	Basement Extract Fan - EF - B-1, 290 cfm - inline fan	1	EA	550.00	550.00	660.00	660.00		1,210.00
	Exhaust fan, EF-B-2, 225 cfm, inline	1	EA	550.00	550.00	660.00	660.00		1,210.00
	Toilet exhaust fan, EF-R-1, 600 cfm, with roof curb	1	EA	550.00	550.00	660.00	660.00		1,210.00
	<b>Subtotal</b>				<b>10,450.00</b>		<b>3,740.00</b>		<b>14,190.00</b>
233713	<b>Diffusers, Registers and Grills</b>								
	Drum louver DL-2-24x8	7	EA	110.00	770.00	110.00	770.00		1,540.00
	Drum louver DL-1-30x8		EA		Included with above item		Included with above item		
	Supply diffuser SD-1, 14x8	10	EA	72.00	720.00	110.00	1,100.00		1,820.00
	Supply diffuser SD-1, 26x8		EA		Included with above item		Included with above item		
	Supply diffuser CD-1, 24" diam.		EA		Included with above item		Included with above item		
	Return grille SG-1-10x6	13	EA	72.00	936.00	110.00	1,430.00		2,366.00

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Labor Cost
	Transfer register TR-1-22x8		EA			Included with above item			
	Return register RR1, 8x8		EA			Included with above item			
	Return register RR2, 14x14		EA			Included with above item			
	Return grill RG-1-6x6		EA			Included with above item			
	Return grill EG-1/2-8x8		EA			Included with above item			
	Return grill RG-1-24x6		EA			Included with above item			
	Return grill RG 6'x3'		EA			Included with above item			
	Return grill RG 14'x2'		EA			Included with above item			
	Return grill TG-1-6'x6'		EA			Included with above item			
	Door Louver L-12x6 @ first floor (M & W bathrooms)	2	EA	72.00	144.00	110.00	220.00	364.00	
	Exterior Louver within existing window frame-12x6 @ cellar (recycling room)	1	EA	150.00	150.00	350.00	350.00	500.00	
	Intake louver 12x12	1	EA	440.00	440.00	440.00	440.00	880.00	
	Intake louver 26x12	1	EA	440.00	440.00	440.00	440.00	880.00	
	WWS and frame		SF			Included with above two items			
	Connect to existing louver		EA			Included with above two items			
	Volume damper		SF			Included with above two items			
	Elevator shaft vent & 1/2" of area barometric relief damper	4	SF	110.00	440.00	220.00	880.00	1,320.00	
	Motorized damper		SF			Included in duct accessories			
	<b>Subtotal</b>				<b>4,040.00</b>		<b>5,630.00</b>	<b>9,670.00</b>	
237413	<b>Packages, Outdoor, Central Station Air Handling Units</b>								
	VAV roof top packaged air cooled conditioner, with DX cooling, coil gas heat, 5,330 supply fan VFD, 17.5 ton cooling-RTU-1	1	EA	49,500.00	49,500.00	5,500.00	5,500.00	55,000.00	
	VAV roof top packaged air cooled conditioner, with DX cooling, coil gas heat, 5,840 supply fan VFD, 20 ton cooling-RTU-2	1	EA	49,500.00	49,500.00	5,500.00	5,500.00	55,000.00	
	HV unit, 500 CFM, 46.16 MBUH, Hot water Coil	1	EA	11,000.00	11,000.00	3,850.00	3,850.00	14,850.00	
	<b>Subtotal</b>								

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost		
238219	Fan Coil Units								
	Mini Split System ACU/ACU 1/3-1.5 ton	3	EA	3,300.00	9,900.00	5,500.00	16,500.00	26,400.00	
	Fin Tube Radiation								
	Fin Tube Radiation-FTR-1 Covers by Architecture		LF	This item not found in the drawing					
	Fin Tube Radiation-FTR-2 Covers by Architecture	7	LF	1,100.00	7,700.00	1,650.00	11,550.00	19,250.00	
	Fin Tube Radiation-Relocated-cellar	1	EA	220.00	220.00	1,430.00	1,430.00	1,650.00	
	Fin Tube Radiation-Relocated-second floor	2	EA	220.00	440.00	1,430.00	2,860.00	3,300.00	
	Convactor-Relocated-third floor		EA	This item not found in the drawing					
	<b>Subtotal</b>				<b>128,260.00</b>		<b>47,190.00</b>	<b>175,450.00</b>	
238239	Unit Heaters								
	Cabinet Unit Heater CHU-1, 310 cfm, 22.5 MBH	1	EA	4,100.00	4,100.00	3,300.00	3,300.00	7,400.00	
	<b>Subtotal</b>				<b>4,100.00</b>		<b>3,300.00</b>	<b>7,400.00</b>	
	<b>Division 26 - Electrical</b>								
260500	Common Work Results for Electrical								
	Sleeve through wall & slab	1	LS	4,000.00	4,000.00	4,400.00	4,400.00	8,400.00	
	Fire stopped and sealed where required	1	LS	8,000.00	8,000.00	8,800.00	8,800.00	16,800.00	
	2-1/2" emt sleeves + 25 pair cable at cellar	200	LF	7.00	1,400.00	26.00	5,200.00	6,600.00	
	<b>Subtotal</b>				<b>13,400.00</b>		<b>18,400.00</b>	<b>31,800.00</b>	
260519	Low-Voltage Electrical Power Conductors and Cables								
	Service & Distribution								
	Electrical Feed-Elevator, 1-1/2C, 3#1/0+1#6G	110	LF	10.35	1,138.50	31.00	3,410.00	4,548.50	
	Electrical Feed-condenser, fan, HV	30	LF	1.25	37.50	14.40	432.00	469.50	
	Electrical Feed-AC, CU, EF-RTU	180	LF	2.60	468.00	16.00	2,880.00	3,348.00	
	Electrical Feed-RTU	100	LF	9.10	910.00	30.00	3,000.00	3,910.00	
	Electrical Feed-MDP, (2)4W 500 KCMIL+(1)#10G	80	LF	35.00	2,800.00	66.00	5,280.00	8,080.00	
	Electrical Feed-Panels PIP-C, PIP-1, PIP-2, PIP-3	350	LF	6.20	2,170.00	26.40	9,240.00	11,410.00	

## NYC DEPT DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	Electrical Feed-Panels MP-C, 2-1/2"C, 3#4/0+1#4/0N+1#4G	50	LF	21.00	1,050.00	45.00	2,250.00	3,300.00	
	Equipment -3#500+1#500G-3-1/2"C	40	LF	35.00	1,400.00	66.00	2,640.00	4,040.00	
	Light conduit and wiring	2,500	LF	2.30	5,750.00	12.80	32,000.00	37,750.00	
	Branch conduit & wiring, 3/4" EMT with 4#12	3,000	LF	2.80	8,400.00	13.40	40,200.00	48,600.00	
	Time switch management	1	LS	1,900.00	1,900.00	2,090.00	2,090.00	3,990.00	
	Rewire circuits at basement	1	LS	4,425.00	4,425.00	4,870.00	4,870.00	9,295.00	
	Rewire circuits at third floor	1	LS	4,425.00	4,425.00	4,870.00	4,870.00	9,295.00	
	<b>Subtotal</b>				<b>34,874.00</b>		<b>113,162.00</b>	<b>148,036.00</b>	
260526	<b>Grounding and Bonding for Electrical System</b>								
	Grounding & testing	1	LS	2,140.00	2,140.00	2,334.00	2,334.00	4,474.00	
	<b>Subtotal</b>				<b>2,140.00</b>		<b>2,334.00</b>	<b>4,474.00</b>	
260529	Hanger and Support for Electrical System - included in other sections	1	LS	21,850.00	21,850.00	114,000.00	114,000.00	135,850.00	
260533	Raceways and Boxes for Electrical system - included in other sections								
260548	Vibration and seismic controls for Electrical system - included in other sections								
260553	Identification for Electrical system - included in other sections								
260573	Overcurrent Protective Device Coordination Study - included in other sections								
262413	<b>Switchboards</b>								
	Meter Pan, Meter CT cabinet and end box	1	LS	2,500.00	2,500.00	3,912.00	3,912.00	6,412.00	
262416	<b>Panelboards</b>				<b>24,350.00</b>		<b>117,912.00</b>	<b>142,262.00</b>	
	Main distribution panel fused disconnect, 800 amp	1	EA	0.00	0.00	4,474.00	4,474.00	4,474.00	
	Main distribution panel MPD, 800 amp, 120/208	1	EA	0.00	0.00	9,015.00	9,015.00	9,015.00	
	Mechanical power panel MP-C, 225A, 120/208V, 3ph, 4w	1	EA	0.00	0.00	3,605.00	3,605.00	3,605.00	
	Electrical panel MP-C, 225A, 120/208V, 3ph, 4w	1	EA	0.00	0.00	5,150.00	5,150.00	5,150.00	

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	Electrical panel PLP-C, PLP-1, PLP-2, PLP-3, 100A, 120/208V, 3ph, 4w	4	EA	0.00	0.00	4,600.00	18,400.00	18,400.00
	Lighting relay panel	1	EA	0.00	0.00	1,783.00	1,783.00	1,783.00
	Surge suppressor	1	EA	0.00	0.00	695.00	695.00	695.00
	Switch gear package	1	LS	37,315.00	37,315.00	0.00	0.00	37,315.00
	<b>Subtotal</b>				<b>37,315.00</b>		<b>43,122.00</b>	<b>80,437.00</b>
262726	<b>Wiring Devices</b>							
	Toggle switch-fused, CHU, EF, HV-1, P1, UH-1	8	EA	23.00	184.00	92.00	736.00	920.00
	Switches-single pole	1	EA	18.70	18.70	151.00	151.00	169.70
	Switches-dimer switch	5	EA	67.70	338.50	140.00	700.00	1,038.50
	Switches-St-digital time wall switch	3	EA	34.35	103.05	120.00	360.00	463.05
	Switches-PC-ceiling mounted day light sensor	4	EA	0.00	0.00	100.00	400.00	400.00
	Switches-OC1-ceiling mounted occupancy sensor	3	EA	0.00	0.00	100.00	300.00	300.00
	Switches-OC2-dual tech ceiling mounted occupancy sensor	5	EA	0.00	0.00	100.00	500.00	500.00
	Switches-OC3-wall mounted occupancy sensor	2	EA	0.00	0.00	100.00	200.00	200.00
	Switches-OC4-wall mounted occupancy sensor throw optics	1	EA	0.00	0.00	100.00	100.00	100.00
	Duplex Receptacles	2	EA	25.50	51.00	211.00	422.00	473.00
	GFIC Receptacles	3	EA	35.70	107.10	196.00	588.00	695.10
	Quad Receptacles	50	EA	50.00	2,500.00	249.00	12,450.00	14,950.00
	Quad Receptacles - GFI	0	EA	0.00	0.00	0.00	0.00	0.00
	Quad Receptacles - floor mounted -2 power	0	EA	0.00	0.00	0.00	0.00	0.00
	Quad Receptacles - floor mounted -2 power + data	5	EA	316.00	1,580.00	300.00	1,500.00	3,080.00
	Quad Receptacles - floor mounted -4 power	7	EA	380.00	2,660.00	348.00	2,436.00	5,096.00
	Quad Receptacles - floor mounted -4 power + 2 data	38	EA	443.00	16,834.00	382.00	14,516.00	31,350.00
	Quad Receptacles - cig mounted -cellar	1	EA	50.00	50.00	249.00	249.00	299.00
	Cable tray	120	EA	6.30	756.00	37.00	4,440.00	5,196.00
	J-Box	168	EA	9.00	1,512.00	66.00	11,088.00	12,600.00

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
	Pull box	6	EA	95.00	570.00	551.00	3,306.00	3,876.00
	Channeling of floor slab for conduits	0	EA	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>				<b>27,264.35</b>		<b>54,442.00</b>	<b>81,706.35</b>
262813	Fuses - Included in other items							
262816	Enclosed Switches and Circuit Breakers							
	Disconnect, Elevator	1	EA	945.00	945.00	1,982.00	1,982.00	2,927.00
	Disconnect switch - fused, AC, CU, EF-RTU	7	EA	147.00	1,029.00	595.00	4,165.00	5,194.00
	Disconnect switch - fused, AC, CU, EF-RTU, WP	2	EA	230.00	460.00	595.00	1,190.00	1,650.00
	Disconnect switch -RTU, WP	2	EA	1,148.00	2,296.00	1,982.00	3,964.00	6,260.00
	Time switch management	1	EA	189.00	189.00	209.00	209.00	398.00
	<b>Subtotal</b>				<b>4,919.00</b>		<b>11,510.00</b>	<b>16,429.00</b>
265000	Architectural Lighting Fixture Specifications							
	Light fixture @ cellar							
	Type C1: 4'-0" x6" strip light fixture, pendant mounted, fluorescent	7	EA	0.00	0.00	220.00	1,540.00	1,540.00
	Type C1: 4'-0" x6" strip light fixture, pendant mounted, fluorescent - EMERG	5	EA	0.00	0.00	220.00	1,100.00	1,100.00
	Type C2: 4'-0" x6" strip light fixture, wall mounted, fluorescent	3	EA	0.00	0.00	220.00	660.00	660.00
	Type C2: 4'-0" x6" strip light fixture, wall mounted, fluorescent - EMERG	3	EA	0.00	0.00	220.00	660.00	660.00
	Type C3: 4'-0" x6" strip light fixture, surface mounted, fluorescent	9	EA	0.00	0.00	220.00	1,980.00	1,980.00
	Type C3: 4'-0" x6" strip light fixture, surface mounted, fluorescent - EMERG	4	EA	0.00	0.00	220.00	880.00	880.00
	Type elevator pit light - jelly jar	1	EA	0.00	0.00	71.00	71.00	71.00
	Exit light (LED)	4	EA	0.00	0.00	137.00	548.00	548.00
	Light fixture @ 1st floor							

## NYC DEPT OF DESIGN+CONSTRUCTION

Project: NY Public Library - Woodstock Branch Renovation

Location: 761 160TH Street, Bronx, NY 10465

CONTRACT 1-GENERAL CONST.

FMS ID No: LNEMA08WS

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Total Cost
265000	Type A1: 8'-0" x6" strip light fixture, surface mounted, fluorescent	48	EA	0.00	0.00	220.00	10,560.00	10,560.00	10,560.00
	Type A1: 8'-0" x6" strip light fixture, surface mounted, fluorescent - EMERG	6	EA	0.00	0.00	220.00	1,320.00	1,320.00	1,320.00
	Type C: 6" downlight - EMERG, recessed	4	EA	0.00	0.00	220.00	880.00	880.00	880.00
	Type C1: 4'-0" x6" strip light fixture, pendant mounted, fluorescent	0	EA	0.00	0.00	220.00	0.00	0.00	0.00
	Type C2: 4'-0" x6" strip light fixture, wall mounted, fluorescent	0	EA	0.00	0.00	220.00	0.00	0.00	0.00
	Type C2: 4'-0" x6" strip light fixture, wall mounted, fluorescent - EMERG	0	EA	0.00	0.00	220.00	0.00	0.00	0.00
	Type C5: 4'-0" x6" directed industrial, wall mounted, fluorescent	3	EA	0.00	0.00	220.00	660.00	660.00	660.00
	Type C5: 4'-0" x6" strip light fixture, wall mounted, fluorescent - EMERG	3	EA	0.00	0.00	220.00	660.00	660.00	660.00
	Type C7: 5'-0" x6" strip light fixture, pendant mounted, fluorescent	10	EA	0.00	0.00	220.00	2,200.00	2,200.00	2,200.00
	Type C7: 5'-0" x6" strip light fixture, pendant mounted, fluorescent - EMERG	2	EA	0.00	0.00	220.00	440.00	440.00	440.00
	Type D: 2'-0" x6" strip light fixture, wall mounted, fluorescent	1	EA	0.00	0.00	137.00	137.00	137.00	137.00
	Type W: blue warning light - see security	1	EA	0.00	0.00	137.00	137.00	137.00	137.00
	Exit light (LED)	3	EA	0.00	0.00	137.00	411.00	411.00	411.00
	Light fixture @ 2nd floor								
	Type A1: 8'-0" x6" strip light fixture T-8, surface mounted, fluorescent	29	EA	0.00	0.00	220.00	6,380.00	6,380.00	6,380.00
	Type A1: 8'-0" x6" strip light fixture T-8, surface mounted, fluorescent - EMERG	6	EA	0.00	0.00	220.00	1,320.00	1,320.00	1,320.00
	Type C: 6" downlight - EMERG, recessed	4	EA	0.00	0.00	220.00	880.00	880.00	880.00
	Type C1: 4'-0" x6" strip light fixture, pendant mounted, fluorescent	0	EA	0.00	0.00	220.00	0.00	0.00	0.00
	Type C1: 4'-0" x6" strip light fixture, pendant mounted, fluorescent - EMERG	0	EA	0.00	0.00	220.00	0.00	0.00	0.00
	Type C4: 4'-0" x6" directed industrial, clg. mounted, fluorescent	6	EA	0.00	0.00	220.00	1,320.00	1,320.00	1,320.00
	Type C4: 4'-0" x6" directed industrial, clg. mounted, fluorescent - EMERG	4	EA	0.00	0.00	220.00	880.00	880.00	880.00
	Type B1: 48" dia light fixture @ lobby	1	EA	0.00	0.00	220.00	220.00	220.00	220.00
	Type B2: 30" dia light fixture @ lobby	2	EA	0.00	0.00	333.00	666.00	666.00	666.00

Bidder: National Environmental Safety Company, Inc. Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Total Cost	Labor Cost
265000	Exit light (LED)	2	EA	0.00	0.00	137.00	274.00	274.00	274.00
	Light fixture @ 3rd floor								
	Type C1: 4'-0" x6" strip light fixture, pendant mounted, fluorescent	0	EA	0.00	0.00	220.00	0.00	0.00	0.00
	Type C1: 4'-0" x6" strip light fixture, pendant mounted, fluorescent - EMERG	0	EA	0.00	0.00	220.00	0.00	0.00	0.00
	Type C5: 4'-0" x6" directed industrial, wall mounted, fluorescent	2	EA	0.00	0.00	220.00	440.00	440.00	440.00
	Type C6: 4'-0" x6" directed industrial, pendant mounted, fluorescent	3	EA	0.00	0.00	220.00	660.00	660.00	660.00
	Type C6: 4'-0" x6" directed industrial, pendant mounted, fluorescent - EMERG	2	EA	0.00	0.00	220.00	440.00	440.00	440.00
	Type C7: 5'-0" x6" strip light fixture, pendant mounted, fluorescent	12	EA	0.00	0.00	220.00	2,640.00	2,640.00	2,640.00
	Type C7: 5'-0" x6" strip light fixture, pendant mounted, fluorescent - EMERG	2	EA	0.00	0.00	220.00	440.00	440.00	440.00
	Exit light (LED)	2	EA	0.00	0.00	137.00	274.00	274.00	274.00
	Stair lighting - EMERG	1	EA	0.00	0.00	870.00	870.00	870.00	870.00
	Light packages	1	LS	22,000.00	22,000.00	0.00	0.00	0.00	22,000.00
	<b>Subtotal</b>				<b>22,000.00</b>		<b>42,548.00</b>	<b>42,548.00</b>	<b>64,548.00</b>
270000	<b>Division 27 - Communications</b>								
270526	<b>Communications Grounding and Bonding</b>								
	Telecom grounding busbar	4	EA	253.00	1,012.00	330.00	1,320.00	1,320.00	2,332.00
	<b>Subtotal</b>				<b>1,012.00</b>		<b>1,320.00</b>	<b>1,320.00</b>	<b>2,332.00</b>
270528	<b>Communications Pathways</b>								
	18"x34" access panel (1st, 2nd, & 3rd floor)	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
	12" cable tray	120	LF	6.30	756.00	37.50	4,500.00	4,500.00	5,256.00
	12" vertical cable tray @ communication riser	0	LF	0.00	0.00	0.00	0.00	0.00	0.00
	4'x8'x3/4" fire-rated plywood	8	SF	69.50	556.00	601.00	4,808.00	4,808.00	5,364.00
	Voice, data patch panel & rack	1	EA	0.00	0.00	1,102.00	1,102.00	1,102.00	1,102.00
	Telecom 48 port patch panel, backbone & equipment rack	1	EA	0.00	0.00	1,102.00	1,102.00	1,102.00	1,102.00
	Voice, backbone/riser termination blockdata patch panel & rack	1	EA	0.00	0.00	3,005.00	3,005.00	3,005.00	3,005.00
	1D Data outlets (floor box)	0	EA	70.00	0.00	249.00	0.00	0.00	0.00

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	3D - Data outlets (floor box)	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Tel/Data outlets - 1V/2D outlet	3	EA	1.20	3.60	24.00	72.00	24.00	75.60
	Analog voice outlet - 1A-D	1	EA	1.20	1.20	24.00	24.00	24.00	25.20
	TV outlet	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Telephone outlets	2	EA	1.20	2.40	24.00	48.00	24.00	50.40
	Tel/Data outlets	1	EA	1.20	1.20	24.00	24.00	24.00	25.20
	Tel/Data outlets above ceiling	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
	WAP-2 port wireless access point	5	EA	1.20	6.00	24.00	120.00	24.00	126.00
	WLAN-Data single - receptor	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Tel/Data 1" empty conduit	500	LF	2.60	1,300.00	16.00	8,000.00	16.00	9,300.00
	1" emt + grounding conductor	500	LF	2.66	1,330.00	16.00	8,000.00	16.00	9,330.00
	4" sleeve to corridor for cables running	1	EA	1,320.00	1,320.00	7,286.00	7,286.00	7,286.00	8,606.00
	2" conduit sleeve to exterior wall for station cables	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
	4" conduit sleeve thru concrete slab	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Miscellaneous technology	1	LS	12,650.00	12,650.00	13,915.00	13,915.00	13,915.00	26,565.00
	<b>Subtotal</b>				<b>17,926.40</b>		<b>52,006.00</b>		<b>69,932.40</b>
271000	<b>Communication Cabling</b>								
	Allow for Cat 6 Cabling	25,000	LF	0.53	13,250.00	7.25	181,250.00	7.25	194,500.00
	<b>Subtotal</b>				<b>13,250.00</b>		<b>181,250.00</b>		<b>194,500.00</b>
280000	<b>Division 28 - Electronic Safety and Security</b>								
281000	<b>Security System</b>								
	Security rack: 1 - Star (hook ups to LAN), 17" monitor, DVR, USB control module, UTP receiver HUB	1	LS	0.00	0.00	1,102.00	1,102.00	1,102.00	1,102.00
	It rack 1 & 2	1	LS	0.00	0.00	1,102.00	1,102.00	1,102.00	1,102.00
	Battery backup	1	EA	0.00	0.00	139.00	139.00	139.00	139.00
	SDF - security distribution frame: security device, lock power supply, cctv power supply, etc.	1	EA	0.00	0.00	417.00	417.00	417.00	417.00
	4'x8'x3/4" fire-rated plywood	2	EA	83.00	166.00	275.00	550.00	275.00	716.00

Bidder: National Environmental Safety Company, Inc.

Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
	8"x8"x96" trough for security cables	1	EA	456.00	456.00	1,282.00	1,282.00	1,738.00	1,738.00
	New 6"x6"x24" trough for security cables	1	EA	388.00	388.00	600.00	600.00	988.00	988.00
	Motion sensor - wall mounted	5	EA	0.00	0.00	176.00	880.00	880.00	880.00
	Motion sensor - ceiling mounted	2	EA	0.60	1.20	172.00	344.00	345.20	345.20
	Door contract	1	EA	0.00	0.00	154.00	154.00	154.00	154.00
	Distrees button	1	EA	0.00	0.00	154.00	154.00	154.00	154.00
	Security camera								
	wall mounted	4	EA	0.00	0.00	330.00	1,320.00	1,320.00	1,320.00
	wall mounted - PAN/tilt camera	4	EA	0.00	0.00	330.00	1,320.00	1,320.00	1,320.00
	ceiling mounted	4	EA	0.00	0.00	330.00	1,320.00	1,320.00	1,320.00
	pedestal mounted	2	EA	0.00	0.00	220.00	440.00	440.00	440.00
	C/ELR/PT: card reader - Tyco RM2L-PH (see Bid Booklet page 2e)	6	EA	0.00	0.00	0.00	0.00	0.00	0.00
	C/ELR/PT: card reader - Install plus delivery, overhead, tax	6	EA	0.00	0.00	330.00	1,980.00	1,980.00	1,980.00
	IDS - intrusion detection system keypad	6	EA	0.00	0.00	330.00	1,980.00	1,980.00	1,980.00
	USB Control Module - American Dynamics AdaCSNET (see Bid Booklet page 2e)	1	EA	0.00	0.00	0.00	0.00	0.00	0.00
	USB Control Module - Install plus delivery, overhead, tax	1	EA	0.00	0.00	220.00	220.00	220.00	220.00
	Control Relay	2	EA	0.00	0.00	220.00	440.00	440.00	440.00
	Maglock at shoe (failsafe and hook up to fire alarm) @ main entrance	23	EA	0.00	0.00	225.00	5,175.00	5,175.00	5,175.00
	Type W: blue warning light @ vestibule	4	EA	0.00	0.00	396.00	1,584.00	1,584.00	1,584.00
	Security conduit & wiring	6	EA	0.00	0.00	293.00	1,758.00	1,758.00	1,758.00
	Integrator	7	EA	0.00	0.00	778.00	5,446.00	5,446.00	5,446.00
	1" conduit sleeve thru concrete slab and core drill for entry vestibule	1	LS	1,100.00	1,100.00	2,750.00	2,750.00	3,850.00	3,850.00
	3/4" conduit sleeve thru concrete slab and core drill for dress button	1	LS	1,100.00	1,100.00	2,750.00	2,750.00	3,850.00	3,850.00
	Security	1	EA	0.00	0.00	0.00	0.00	0.00	0.00

Bidder: National Environmental Safety Company, Inc. Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
281000	Access Controller - Tyco STAR016 - 2URM - (see Bid Booklet page 2e)	1	EA	0.00	0.00	2,086.00	2,086.00	2,086.00	2,086.00
	HID Reader - (see Bid Booklet page 2e)	9	EA	0.00	0.00	695.00	6,255.00	6,255.00	6,255.00
	Digital Video Management System - American Dynamics ADD6RODVD100 - (see Bid Booklet page 2F)	1	EA	0.00	0.00	1,392.00	1,392.00	1,392.00	1,392.00
	LCD Monitor Belkin F1DC101P - DR (see Bid Booklet page 2F)	1	EA	0.00	0.00	2,783.00	2,783.00	2,783.00	2,783.00
	Passive UTP Tranceiver Hub - Altronix Hubway 16CD - (see Bid Booklet page 2F)	1	EA	0.00	0.00	2,087.00	2,087.00	2,087.00	2,087.00
	Security System Lump Sum Proprietary Items (material for install)	1	LS	37,472.00	37,472.00	0.00	0.00	37,472.00	37,472.00
	<b>Subtotal</b>				<b>40,683.20</b>		<b>49,810.00</b>	<b>49,810.00</b>	<b>90,493.20</b>
283111	<b>Digital Addressable Fire - Alarm System</b>								
	Fire Alarm Control Panel (GE Security EST3) (see Bid Booklet page 2e)	1	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Fire Alarm Control Panel - Install plus delivery, overhead, tax	1	EA	0.00	0.00	2,732.00	2,732.00	2,732.00	2,732.00
	Annunciator Panel (GE Security EST3) (see Bid Booklet page 2e)	1	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Annunciator Panel - Install plus delivery, overhead, tax	1	EA	0.00	0.00	2,247.00	2,247.00	2,247.00	2,247.00
	Fused disconnect switch, 30 amp	1	EA	148.00	148.00	595.00	595.00	743.00	743.00
	Smoke Detector (GE Security EST3: SIGA2-PS) - Material only (see Bid Booklet page 2B)	51	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Smoke Detector - Install plus delivery, overhead, tax only	51	EA	0.00	0.00	202.00	10,302.00	10,302.00	10,302.00
	Smoke Detector - elevator overrun - (GE Security EST3: SIGA2-PS) - Material only (see Bid Booklet page 2c)	4	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Smoke Detector - elevator overrun - Install plus delivery, overhead, tax only	4	EA	0.00	0.00	202.00	808.00	808.00	808.00
	Heat Detector - elevator overrun - (GE Security EST3: SIGA2-HRS) - Material only (see Bid Booklet page 2b)	8	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Heat Detector - Install plus delivery, overhead, tax only	8	EA	0.00	0.00	202.00	1,616.00	1,616.00	1,616.00
	Water Flow Switch (GE Security EST3: SIGA2-CT1) - Material only (see Bid Booklet page 2c)	2	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Water Flow Switch - Install plus delivery, overhead, tax only	2	EA	0.00	0.00	290.00	580.00	580.00	580.00
	Tamper Switch (GE Security EST3: SIGA2-CT1) - Material only (see Bid Booklet page 2c)	2	EA	0.00	0.00	0.00	0.00	0.00	0.00
	Tamper Switch - Install plus delivery, overhead, tax only	2	EA	0.00	0.00	290.00	580.00	580.00	580.00

Client Agency: NYPL

Bidder: National Environmental Safety Company, Inc.

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost
				Unit Cost	Total Cost	Unit Cost	Total Cost	
283111	End of Line Device	4	EA	0.00	0.00	202.00	808.00	808.00
	Manual Pull Station (GE Security EST3: SIGA2-270) - Material only (see Bid Booklet page 2b)	15	EA	0.00	0.00	0.00	0.00	0.00
	Manual Pull Station - Install plus delivery, overhead, tax only	15	EA	0.00	0.00	155.00	2,325.00	2,325.00
	Manual Pull Station - WP (GE Security EST3: SIGA2-270) - Material only (see Bid Booklet page 2b)	1	EA	0.00	0.00	0.00	0.00	0.00
	Manual Pull Station - WP - Install plus delivery, overhead, tax only	1	EA	0.00	0.00	202.00	202.00	202.00
	Duct Detector (GE Security EST3: SIGA-SD) - Material only (see Bid Booklet page 2c)	24	EA	0.00	0.00	0.00	0.00	0.00
	Duct Detector - Install plus delivery, overhead, tax only	24	EA	0.00	0.00	661.00	15,864.00	15,864.00
	Control Down Relay (GE Security EST3: SIGA-CR) - Material only (see Bid Booklet page 2d)	3	EA	0.00	0.00	0.00	0.00	0.00
	Control Down Relay - Install plus delivery, overhead, tax only	3	EA	0.00	0.00	2,750.00	8,250.00	8,250.00
	Remote Indicator Light (GE Security EST3: SIGA-SD) - Material only (see Bid Booklet page 2c)	1	EA	0.00	0.00	0.00	0.00	0.00
	Remote Indicator Light - Install plus delivery, overhead, tax only	1	EA	0.00	0.00	300.00	300.00	300.00
	Horn/Strobe (GE Security EST3: GIRF-HDMV) - Material only (see Bid Booklet page 2d)	29	EA	0.00	0.00	0.00	0.00	0.00
	Horn/Strobe - Install plus delivery, overhead, tax only	29	EA	0.00	0.00	176.00	5,104.00	5,104.00
	Horn/Strobe - WP - (GE Security EST3: GIRF-HDMV) - Material only (see Bid Booklet page 2d)	1	EA	0.00	0.00	0.00	0.00	0.00
	Horn/Strobe - WP - Install plus delivery, overhead, tax only	1	EA	0.00	0.00	218.00	218.00	218.00
	Strobe (GE Security EST3: GIRF-VM) - Material only (see Bid Booklet page 2d)	4	EA	0.00	0.00	0.00	0.00	0.00
	Strobe - Install plus delivery, overhead, tax only	4	EA	0.00	0.00	176.00	704.00	704.00
	B, electric bell (GE Security EST3: GIRF-VM) - Material only (see Bid Booklet page 2d)	1	EA	0.00	0.00	0.00	0.00	0.00
	B, electric - Install plus delivery, overhead, tax only	1	EA	0.00	0.00	695.00	695.00	695.00
	FSD	1	LS	1,000.00	1,000.00	3,000.00	3,000.00	4,000.00

Bidder: National Environmental Safety Company, Inc.  
 Client Agency: NYPL

CSI NO	Description	Qty	Unit	Material		Labor		Total Material & Labor Cost	
				Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
283111	Electric Feed - FACP, 3/4"C, 1#10+1#10N+1#10G	1	EA	316.00	316.00	695.00	695.00	1,011.00	1,011.00
	Fire alarm wiring	20,250	LF	1.00	20,250.00	3.70	74,925.00	95,175.00	95,175.00
	Testing	1	LS	0.00	0.00	8,000.00	8,000.00	8,000.00	8,000.00
	Interface unit	1	EA	0.00	0.00	695.00	695.00	695.00	695.00
	Control Relay	1	EA	0.00	0.00	695.00	695.00	695.00	695.00
	<b>Subtotal</b>				<b>21,714.00</b>		<b>141,940.00</b>	<b>169,654.00</b>	<b>169,654.00</b>
	Miscellaneous Electrical Items	1	LS	40,000.00	40,000.00	110,000.00	110,000.00	145,775.20	145,775.20
	<b>Subtotal</b>				<b>40,000.00</b>		<b>105,775.20</b>	<b>145,775.20</b>	<b>145,775.20</b>
310000	<b>Division 31 - Earthwork</b>								
031200	Earthwork								
	Excavation for water line	20	CY	10.00	200.00	60.00	1,200.00	1,400.00	1,400.00
	Sand bedding	5	CY	60.00	300.00	60.00	300.00	600.00	600.00
	Backfill	15	CY	50.00	750.00	60.00	900.00	1,650.00	1,650.00
	Disposal	20	CY	10.00	200.00	50.00	1,000.00	1,200.00	1,200.00
	8x6 elevator pit & pump pit: concrete SOG & walls, waterproofing, ladder, excavation & disposal @ basement	1	EA	500.00	500.00	2,500.00	2,500.00	3,000.00	3,000.00
	<b>Subtotal</b>				<b>1,950.00</b>		<b>5,900.00</b>	<b>7,850.00</b>	<b>7,850.00</b>
<b>A</b>	<b>TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK</b>				<b>1,994,200.00</b>		<b>3,562,859.00</b>	<b>5,557,059.00</b>	<b>5,557,059.00</b>

**B** Allowance for Incidental Asbestos Abatement 30,000.00

**C** Amount for Proprietary Items (Pages 2a-2f) 68,261.00

**Total Bid Price (A + B + C) 5,655,320.00**

**A. PROJECT REFERENCES - SIMILAR CONTRACTS COMPLETED BY THE BIDDER**

List all contracts substantially completed within the last 4 years similar to the contract being awarded, up to a maximum of 10, in descending order of date of substantial completion.

Project & Location	Contract Type	Contract Amount (\$000)	Date Completed	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. if different from owner
Edenwald Houses Bronx, NY	G.C.	\$ 3,000,000.00	3/01/2011	NYCHA David Wong (347) 415-5301	same
Bronx Comm. College Bronx, NY	G.C.	\$ 15,339,000.00	4/01/2011	DAENY P. Shah (917) 509-9894	TDX NA
Walton H.S. Bronx, NY	G.C.	\$ 15,674,000.00	3/01/2011	NYSCA (917) 299-3298	NA
La Guardia H.S. Manhattan, NY	G.C.	\$ 7,669,000.00	8/31/2011	NYSCA George Kambouris (718) 472-8000	P.A. D.A.
PS 224 H.S. Brooklyn, NY	G.C.	\$ 6,318,000.00	8/24/2011	NYSCA Liquellyn Lennon	NA
Unity Plaza Brooklyn, NY	G.C.	\$ 4,654,000.00	9/2011	NYCHA Robert Plummer (718) 707-5646	same

**B. PROJECT REFERENCES - CONTRACTS CURRENTLY UNDER CONSTRUCTION BY THE BIDDER**

List all contracts currently under construction even if they are not similar to the contract being awarded.

Project & Location	Contract Type	Contract Amount (\$000)	Subcontracted to Others (\$000)	Uncompleted Portion (\$000)	Date Scheduled to Complete	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. if different from owner
		See	Previous			Attachments	

NA.

**C. PROJECT REFERENCES - PENDING CONTRACTS NOT YET STARTED BY THE BIDDER**

List all contracts awarded to or won by the bidder but not yet started.

Project & Location	Contract Type	Contract Amount (\$000)	Date Scheduled to Start	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. if different from owner

BID BOND 1  
FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, National Environmental Safety Company, Inc.  
12-17 38th Avenue, Long Island City, NY 11101

hereinafter referred to as the "Principal", and Fidelity and Deposit Company of Maryland  
300 Interpace Parkway, Parsippany, NJ 07054

hereinafter referred to as the "Surety" are held and firmly bound to THE CITY OF NEW YORK,  
hereinafter referred to as the "CITY", or to its successors and assigns in the penal sum of \_\_\_\_\_

**TEN PERCENT OF AMOUNT BID**

( 10% Amt Bid ), Dollars lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the Principal is about to submit (or has submitted) to the City the accompanying proposal, hereby made a part hereof, to enter into a contract in writing for \_\_\_\_\_

Proj. #LNEMA08WS - Cont. #1 General Construction Work - Woodstock Branch Library Renovation and ADA Compliance, 761 E. 160th St., Bronx, NY

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall not withdraw said Proposal without the consent of the City for a period of forty-five (45) days after the opening of bids and in the event of acceptance of the Principal's Proposal by the City, if the Principal shall:

- (a) Within ten (10) days after notification by the City, execute in quadruplicate and deliver to the City all the executed counterparts of the Contract in the form set forth in the Contract Documents, in accordance with the proposal as accepted, and
- (b) Furnish a performance bond and separate payment bond, as may be required by the City, for the faithful performance and proper fulfillment of such Contract, which bonds shall be satisfactory in all respects to the City and shall be executed by good and sufficient sureties, and
- (c) In all respects perform the agreement created by the acceptance of said Proposal as provided in the Information for Bidders, bound herewith and made a part hereof, or if the City shall reject the aforesaid Proposal, then this obligation shall be null and void; otherwise to remain in full force and effect.

BID BOND 2

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to him the Surety hereunder agrees subject only to the payment by the Principal of the premium therefore, if requested by the City, to write the aforementioned performance and payment bonds in the form set forth in the Contract Documents.

It is expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

There shall be no liability under this bond if, in the event of the acceptance of the Principal's Proposal by the City, either a performance bond or payment bond, or both, shall not be required by the City on or before the 30th day after the date on which the City signs the Contract.

The surety, for the value received, hereby stipulates and agrees that the obligations of the Surety and its bond shall in no way be impaired or affected by any postponements of the date upon which the City will receive or open bids, or by any extensions of the time within which the City may accept the Principal's Proposal, or by any waiver by the City of any of the requirements of the Information for Bidders, and the Surety hereby waives notice of any such postponements, extensions, or waivers.

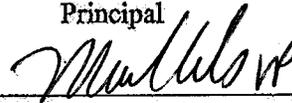
IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the 17th day of July, 2013.

(Seal)

National Environmental Safety Company, Inc.  
\_\_\_\_\_  
(L.S.)

Principal

By: \_\_\_\_\_



(Seal)

Fidelity and Deposit Company of Maryland  
\_\_\_\_\_  
Surety

Surety

By: \_\_\_\_\_

Susan P. Hammel, Attorney-in-Fact

BID BOND 3

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of NY County of Queens ss:  
On this 8 day of August, 2013, before me personally came  
**Mark Canellos** to me known, who, being by me duly sworn, did depose and say  
that he resides at 24-40 LITLEDEN BLVD BAYSIDE NY 11360  
that he is the V.P. of MATTURA / PEN SARKY COP LLC  
the corporation described in and which executed the foregoing instrument; that he knows the seal of said  
corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of  
the directors of said corporation, and that he signed his name thereto by like order.

JAMIE RIVERA  
Notary Public State of New York  
Bronx County  
Lic. #01RI6245854  
Comm. Exp. August 8, 2015

Jamie Rivera  
Notary Public

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:  
On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally appeared  
\_\_\_\_\_ to me known and known to me to be one of the members of the  
firm of \_\_\_\_\_ described in and who executed the foregoing  
instrument, and he acknowledged to me that he executed the same as and for the act and deed of said  
firm.

\_\_\_\_\_  
Notary Public

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:  
On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally appeared  
\_\_\_\_\_ to me known and known to me to be the person described in  
and who executed the foregoing instrument and acknowledged that he executed the same.

\_\_\_\_\_  
Notary Public

AFFIX ACKNOWLEDGMENTS AND JUSTIFICATION OF SURETIES

ACKNOWLEDGEMENT OF PRINCIPAL, OF A CORPORATION

STATE OF NY

SS:

COUNTY OF Queens

On this 8 day of August, 2013 before me personally came Mark Canellos to me known, who, being by me duly sworn did depose and say that he resides at 24-40 Little Neck Blvd. Manhasset NY 11360 that he is the V.P. of NATIONAL TRAVEL SAFETY CORP INC the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

JAMIE RIVERA  
Notary Public State of New York  
Bronx County  
Lic. #01RI6245854  
Comm. Exp. August 8, 2015

*Jamie Rivera*  
Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

SS:

COUNTY OF Nassau

On this 17th day of July, 2013, before me personally came Susan P. Hammel to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Fidelity & Deposit Company of Maryland the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and said instrument and affixed the said seal as Attorney-In-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

LYNN ANN INFANTI  
Notary Public, State of New York  
No. 011NG004351  
Qualified in Suffolk County 2014  
Commission Expires March 23, 2014

*Lynn Ann Infanti*

My commission expires \_\_\_\_\_

Notary Public

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND  
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by JAMES M. CARROLL, Vice President, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint Robert KEMPNER, Robert W. O'KANE, Joseph V. SFORZO and Susan P. HAMMEL, all of Plainview, New York, EACH its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: any and all bonds and undertakings, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND, this 30th day of April, A.D. 2013.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By: *Eric D. Barnes*  
Assistant Secretary  
Eric D. Barnes

*James M. Carroll*  
Vice President  
James M. Carroll

State of Maryland  
City of Baltimore

On this 30th day of April, A.D. 2013, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, JAMES M. CARROLL, Vice President, and ERIC D. BARNES, Assistant Secretary, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposed and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

*Maria D. Adamski*

Maria D. Adamski, Notary Public  
My Commission Expires: July 8, 2015



# FIDELITY AND DEPOSIT COMPANY

OF MARYLAND

600 Red Brook Blvd., Suite 600, Owings Mills, MD 21117

## Statement of Financial Condition As Of December 31, 2012

### ASSETS

Bonds .....	\$ 157,177,826
Stocks .....	23,000,311
Cash and Short Term Investments .....	119,155
Reinsurance Recoverable .....	17,923,564
Other Accounts Receivable .....	35,473,256
<b>TOTAL ADMITTED ASSETS .....</b>	<b>\$ <u>233,694,113</u></b>

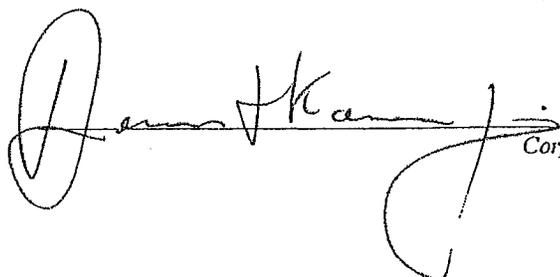
### LIABILITIES, SURPLUS AND OTHER FUNDS

Reserve for Taxes and Expenses .....	\$ 74,782
Ceded Reinsurance Premiums Payable .....	48,323,524
Securities Lending Collateral Liability .....	1,716,240
<b>TOTAL LIABILITIES .....</b>	<b>\$ 50,114,546</b>
Capital Stock, Paid Up .....	\$ 5,000,000
Surplus .....	<u>178,579,567</u>
Surplus as regards Policyholders .....	183,579,567
<b>TOTAL .....</b>	<b>\$ <u>233,694,113</u></b>

Securities carried at \$59,468,002 in the above statement are deposited as required by law.

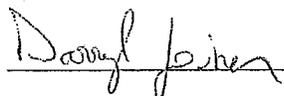
Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of December 31, 2012 market quotations for all bonds and stocks owned, the Company's total admitted assets would be \$243,518,971 and surplus as regards policyholders \$193,404,425.

I, DENNIS F. KERRIGAN, Corporate Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2012.

  
Corporate Secretary

State of Illinois }  
City of Schaumburg } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Illinois, in the City of Schaumburg, this 15th day of March, 2013.

  
Notary Public



Tax ID #: 11-293 9703

**SCHEDULE B - Part II: M/WBE Participation Plan**

Part II to be completed by the bidder/proposer:

Please note: For Non-M/WBE Prime Contractors who will NOT subcontract any services and will self-perform the entire contract, you must obtain a FULL waiver by completing the Waiver Application on pages 9 and 9a and timely submitting it to the contracting agency pursuant to the Notice to Prospective Contractors. Once a FULL WAIVER is granted, it must be included with your bid or proposal and you do not have to complete or submit this form with your bid or proposal.

**Section I: Prime Contractor Contact Information**

Tax ID # 11-293 9703 FMS Vendor ID # \_\_\_\_\_

Business Name National Environmental Safety Contact Person Mark Canellos, VP

Address 12-17 38<sup>th</sup> Avenue, Long Island City, NY 11011

Telephone # (718) 361-0044 Email national@nesco.cc

**Section II: M/WBE Utilization Goal Calculation: Check the applicable box and complete subsection.**

**PRIME CONTRACTOR ADOPTING AGENCY M/WBE PARTICIPATION GOALS**

<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE Participation Goals.	Total Bid/Proposal Value	Agency Total Participation Goals (Line 1, Page 1)	Calculated M/WBE Participation Amount
Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.  Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.	\$ 5,655,320.00	20%	\$ 1,131,064.00
		X	= \$ Line 2

**PRIME CONTRACTOR OBTAINED PARTIAL WAIVER APPROVAL: ADOPTING MODIFIED M/WBE PARTICIPATION GOALS**

<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Modified M/WBE Participation Goals.	Total Bid/Proposal Value	Adjusted Participation Goal (From Partial Waiver)	Calculated M/WBE Participation Amount
Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.  Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.	\$		\$
		X	= \$ Line 3



**BIDDER'S IDENTIFICATION OF SUBCONTRACTORS**

Project ID: LNEMA08WS

**SUBMISSION:** In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form in a separate, sealed envelope (Bid Envelope # 2). To complete this form, the Bidder must identify the subcontractors it intends to use for the work listed below, as well as the dollar amount to be paid to each subcontractor. Failure to complete this form and submit it in a separate, sealed envelope will result in the disqualification of the bid as non-responsive.

The Bidder intends to use the following subcontractors. If the Bidder intends to do any of the work referenced below with its own forces, the Bidder should complete this form using its own name. If multiple subcontractors for any trade are proposed, Bidder may submit multiple copies of this form.

1. **PLUMBING CONTRACTOR:**

Eastern Plumbing & Mechanical Contracting, Inc. *NON MBE*  
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 225,000.00

2. **HVAC CONTRACTOR:**

Midtown HVAC Enterprises LTD *NON MBE*  
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 591,800.00

3. **ELECTRICAL CONTRACTOR:**

Core Electric & Communication Corp. *NON MBE*  
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ 1,120,000.00

**BIDDER'S SIGNATURE:** The Bidder must sign this form in the space provided below:

Name of Bidder: National Environmental Safety Co. Inc.

By: Markellos  
Signature of Partner or Corporate Officer

Print Name: Mark Canellos

Title: Vice President

# Certificate of No Change Form

- Please fill in all the fields and DO NOT leave any field blank.
- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges

I, Dominick Fertitta, President, being duly sworn, state that I have read  
*Enter Your Name*

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

## Vendor Questionnaire *This section is required.*

*This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.*

Name of Submitting Entity: National Environmental Safety Co., Inc.

Vendor's Address: 12-17 38<sup>th</sup> Avenue, L.I.C., NY 11101

Vendor's EIN or TIN: 11-293 9703 Requesting Agency: \_\_\_\_\_

Are you submitting this Certification as a parent? (Please circle one)  Yes  No

Signature date on the last full vendor questionnaire signed by the submitting vendor: 3/07/2012

Signature date on changed submission, if applicable, for the submitting vendor: 3/07/2012

# Principal Questionnaire

This section refers to the most recent principal questionnaire submissions.



Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on Changed Submission (if applicable)
1 Dominick Fertitta	3/07/2012	3/07/2012
2 Mark Canellos	3/07/2012	3/07/2012
3		
4		
5		
6		

Check if additional changes were submitted and attach a document with the date of additional submissions.

## Certification *This section is required.*

*This form must be signed and notarized. Please complete this twice. Copies will not be accepted.*

### Certified By:

Dominick Fertitta

Name (Print)

President

Title

National Environmental Safety Co. Inc.

Name of Submitting Entity

Signature

2/10/2014  
Date

### Notarized By:

Jamie Rivera

Notary Public

JAMIE RIVERA  
Notary Public State of New York  
Bronx County  
Lic. #01PB/ACE94  
Comm. Exp. August 3, 2015

County License Issued

License Number

Sworn to before me on: 2/10/2014  
Date

## SAFETY QUESTIONNAIRE

The bidder must include, with its bid, all information requested on this Safety Questionnaire. Failure to provide a completed and signed Safety Questionnaire at the time of bid opening may result in disqualification of the bid as non-responsive.

**1. Bidder Information:**

Company Name: National Environmental Safety Co., Inc.

DDC Project Number: LNEMA08WS

Company Size:  Ten (10) employees or less

Greater than ten (10) employees

Company has previously worked for DDC ① R & T Building (m.c)  
② Park Slope Armory (m.c)

**2. Type(s) of Construction Work**

TYPE OF WORK	LAST 3 YEARS	THIS PROJECT
General Building Construction	✓	✓
Residential Building Construction	✓	
Nonresidential Building Construction	✓	
Heavy Construction, except building	✓	
Highway and Street Construction		
Heavy Construction, except highways	✓	
Plumbing, Heating, HVAC	✓	
Painting and Paper Hanging	✓	
Electrical Work	✓	
Masonry, Stonework and Plastering	✓	
Carpentry and Floor Work	✓	
Roofing, Siding, and Sheet Metal	✓	
Concrete Work	✓	
Specialty Trade Contracting	✓	
Asbestos Abatement	✓	
Other (specify)		

**3. Experience Modification Rate:**

The Experience Modification Rate (EMR) is a rating generated by the National Council of Compensation Insurance (NCCI). This rating is used to determine the contractor's premium for worker's compensation insurance. The contractor may obtain its EMR by contacting its insurance broker or the NCCI. If the contractor cannot obtain its EMR, it must submit a written explanation as to why.

The Contractor must indicate its Intrastate and Interstate EMR for the past three years. [Note: For contractors with less than three years of experience, the EMR will be considered to be 1.00].

YEAR	INTRASTATE RATE	INTERSTATE RATE
2013-2014	.96	0
2012-2013	.73	0
2011-2012	.89	0

\* If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the contractor must attach, to this questionnaire, a written explanation for the rating and identify what corrective action was taken to correct the situation resulting in that rating.

4. OSHA Information:

No Contractor has received a willful violation issued by OSHA or New York City Department of Buildings (NYCDOB) within the last three years.

No Contractor has had an incident requiring OSHA notification within 8 hours (i.e., fatality, or hospitalization of three or more employees).

\* The Occupational Safety and Health Act (OSHA) of 1970 requires employers with ten or more employees, on a yearly basis to complete and maintain on file the form entitled "Log of Work-related Injuries and Illnesses". This form is commonly referred to as the OSHA 300 Log (OSHA 200 Log for 2001 and earlier).

The OSHA 300 Log must be submitted for the last three years for contractors with more than ten employees.

The Contractor must indicate the total number of hours worked by its employees, as reflected in payroll records for the past three years.

The contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three years. The Incident Rate is calculated in accordance with the formula set forth below. For each given year, the total number of incidents is the total number of non-fatal injuries and illnesses reported on the OSHA 300 Log. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty weeks per year.

$$\text{Incident Rate} = \frac{\text{Total Number of Incidents} \times 200,000}{\text{Total Number of Hours Worked by Employees}}$$

YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
2013	235,415	0
2012	212,316	0
2011	190,268	0

If the contractor's Incident Rate for any of the past three years is one point higher than the Incident Rate for the type of construction it performs (listed below), the contractor must attach, to this questionnaire, a written explanation for the relatively high rate.

General Building Construction	8.5
Residential Building Construction	7.0
Nonresidential Building Construction	10.2
Heavy Construction, except building	8.7
Highway and Street Construction	9.7
Heavy Construction, except highways	8.3
Plumbing, Heating, HVAC	11.3
Painting and Paper Hanging	6.9
Electrical Work	9.5
Masonry, Stonework and Plastering	10.5
Carpentry and Floor Work	12.2
Roofing, Siding, and Sheet Metal	10.3
Concrete Work	8.6
Specialty Trade Contracting	8.6

5. Safety Performance on Previous DDC Project(s)

No Contractor previously audited by the DDC Office of Site Safety.

DDC Project Number(s): \_\_\_\_\_

No Accident on previous DDC Project(s).

No Fatality or Life-altering Injury on DDC Project(s) within the last three years.  
 [Examples of a life-altering injury include loss of limb, loss of a sense (e.g., sight, hearing), or loss of neurological function].

Date: 3/10/2014 By: Mullins W  
 (Signature of Owner, Partner, Corporate Officer)  
 Title: Vice President

The City of New York Department of Small Business Services  
Division of Labor Services Contract Compliance Unit  
110 William Street, New York, New York 10038  
Phone: (212) 513 - 6323  
Fax: (212) 618-8879

### CONSTRUCTION EMPLOYMENT REPORT

#### GENERAL INFORMATION

1. Your contractual relationship in this contract is: Prime contractor  Subcontractor
- 1a. Are M/WBE goals attached to this project? Yes  No
2. Please check one of the following if your firm would like information on how to certify with the City of New York as a:
- Minority Owned Business Enterprise  Locally Based Business Enterprise  
 Women Owned Business Enterprise  Emerging Business Enterprise  
 Disadvantaged Business Enterprise
- 2a. If you are certified as an **MBE, WBE, LBE, EBE** or **DBE**, what city/state agency are you certified with? \_\_\_\_\_ Are you DBE certified? Yes  No
3. Please indicate if you would like assistance from SBS in identifying certified M/WBEs for contracting opportunities: Yes  No
4. Is this project subject to a project labor agreement? Yes  No
5. Are you a Union contractor? Yes  No  If yes, please list which local(s) you affiliated with Carpenters, Local 46, Local 78, Local 79 ACP, IOCA, ICA.
6. Are you a Veteran owned company? Yes  No

#### PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

7. 11-293 9703 National@nesco.cc  
Employer Identification Number or Federal Tax I.D. Email Address
8. National Environmental Safety Company Inc.  
Company Name
9. 12-17 38<sup>th</sup> Avenue, Long Island City, NY 11101  
Company Address and Zip Code
10. Mark Canellos (718) 361-0044  
Chief Operating Officer Telephone Number
11. Same Same  
Designated Equal Opportunity Compliance Officer Telephone Number  
(If same as Item #10, write "same")
12. Same  
Name of Prime Contractor and Contact Person  
(If same as Item #8, write "same")

13. Number of employees in your company: 150 - 200

14. Contract information:

(a) NYC DDC  
Contracting Agency (City Agency)

(b) \$ 5,655,320.00  
Contract Amount

(c) 8502013LN0002C  
Procurement Identification Number (PIN)

(d) \_\_\_\_\_  
Contract Registration Number (CT#)

(e) \_\_\_\_\_  
Projected Commencement Date

(f) \_\_\_\_\_  
Projected Completion Date

(g) Description and location of proposed contract:

General Construction work - Woodstock Branch Library Renovations  
& ADA Compliance, 761 E. 160<sup>th</sup> Street, Bronx, NY

15. Has your firm been reviewed by the Division of Labor Services (DLS) within the past 36 months and issued a Certificate of Approval? Yes \_\_\_ No

If yes, attach a copy of certificate.

16. Has DLS within the past month reviewed an Employment Report submission for your company and issued a Conditional Certificate of Approval? Yes \_\_\_ No

If yes, attach a copy of certificate.

**NOTE: DLS WILL NOT ISSUE A CONTINUED CERTIFICATE OF APPROVAL IN CONNECTION WITH THIS CONTRACT UNLESS THE REQUIRED CORRECTIVE ACTIONS IN PRIOR CONDITIONAL CERTIFICATES OF APPROVAL HAVE BEEN TAKEN.**

17. Has an Employment Report already been submitted for a different contract (not covered by this Employment Report) for which you have not yet received compliance certificate? Yes \_\_\_ No  If yes,

Date submitted: \_\_\_\_\_  
Agency to which submitted: \_\_\_\_\_  
Name of Agency Person: \_\_\_\_\_  
Contract No: \_\_\_\_\_  
Telephone: \_\_\_\_\_

18. Has your company in the past 36 months been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP)? Yes \_\_\_ No

If yes,

(a) Name and address of OFCCP office.

\_\_\_\_\_  
\_\_\_\_\_

(b) Was a Certificate of Equal Employment Compliance issued within the past 36 months?  
Yes\_\_\_ No\_\_\_

If yes, attach a copy of such certificate.

(c) Were any corrective actions required or agreed to? Yes\_\_\_ No\_\_\_

If yes, attach a copy of such requirements or agreements.

(d) Were any deficiencies found? Yes\_\_\_ No\_\_\_

If yes, attach a copy of such findings.

19. Is your company or its affiliates a member or members of an employers' trade association which is responsible for negotiating collective bargaining agreements (CBA) which affect construction site hiring? Yes  No \_\_\_

If yes, attach a list of such associations and all applicable CBA's. *BCA, IDCA, ECA, Carpenters, 79, DDC, Bricklayers, 78, 46, 7 p62*

## PART II: DOCUMENTS REQUIRED

20. For the following policies or practices, attach the relevant documents (e.g., printed booklets, brochures, manuals, memoranda, etc.). If the policy(ies) are unwritten, attach a full explanation of the practices. See instructions.

- (a) Health benefit coverage/description(s) for all management, nonunion and union employees (whether company or union administered)
- (b) Disability, life, other insurance coverage/description
- (c) Employee Policy/Handbook
- (d) Personnel Policy/Manual
- (e) Supervisor's Policy/Manual
- (f) Pension plan or 401k coverage/description for all management, nonunion and union employees, whether company or union administered
- (g) Collective bargaining agreement(s).
- (h) Employment Application(s)
- (i) Employee evaluation policy/form(s).
- (j) Does your firm have medical and/or non-medical (i.e. education, military, personal, pregnancy, child care) leave policy?

21. To comply with the Immigration Reform and Control Act of 1986 when and of whom does your firm require the completion of an I-9 Form?

- |  |   |  |
|--|---|--|
| (a) Prior to job offer                     | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (b) After a conditional job offer          | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (c) After a job offer                      | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (d) Within the first three days on the job | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (e) To some applicants                     | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| (f) To all applicants                      | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (g) To some employees                      | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |
| (h) To all employees                       | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |

22. Explain where and how completed I-9 Forms, with their supportive documentation, are maintained and made accessible.

Stored with National Environmental Safety Co., Inc.'s payroll clerk ~ main office

23. Does your firm or any of its collective bargaining agreements require job applicants to take a medical examination? Yes  No

If yes, is the medical examination given:

- |                                   |   |  |
|-----------------------------------|---|--|
| (a) Prior to a job offer          | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (b) After a conditional job offer | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (c) After a job offer             | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (d) To all applicants             | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |
| (e) Only to some applicants       | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |

If yes, list for which applicants below and attach copies of all medical examination or questionnaire forms and instructions utilized for these examinations.

All Local 78 Asbestos Handlers

24. Do you have a written equal employment opportunity (EEO) policy? Yes  No

If yes, list the document(s) and page number(s) where these written policies are located.

National Environmental Safety Co., Inc.'s Main office (12-17 38<sup>th</sup> Avenue, LIC, NY 11011)

25. Does the company have a current affirmative action plan(s) (AAP) No

- No Minorities and Women  
No Individuals with handicaps  
No Other. Please specify \_\_\_\_\_

26. Does your firm or collective bargaining agreement(s) have an internal grievance procedure with respect to EEO complaints? Yes  No

If yes, please attach a copy of this policy.

If no, attach a report detailing your firm's unwritten procedure for handling EEO complaints.

27. Has any employee, within the past three years, filed a complaint pursuant to an internal grievance procedure or with any official of your firm with respect to equal employment opportunity? Yes \_\_\_ No

If yes, attach an internal complaint log. See instructions.

28. Has your firm, within the past three years, been named as a defendant (or respondent) in any administrative or judicial action where the complainant (plaintiff) alleged violation of any anti-discrimination or affirmative action laws? Yes \_\_\_ No

If yes, attach a log. See instructions.

29. Are there any jobs for which there are physical qualifications? Yes \_\_\_ No

If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

---

30. Are there any jobs for which there are age, race, color, national origin, sex, creed, disability, marital status, sexual orientation, or citizenship qualifications? Yes \_\_\_ No

If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

---

**FORM A. CONTRACT BID INFORMATION: USE OF SUBCONTRACTORS/TRADES**

1. Do you plan to subcontract work on this contract? Yes  No
2. If yes, complete the chart below.

**NOTE: All proposed subcontractors with a subcontract in excess of \$750,000 must complete an Employment Report for review and approval before the contract may be awarded and work commences.**

SUBCONTRACTOR'S NAME*	OWNERSHIP (ENTER APPROPRIATE CODE LETTERS BELOW)	WORK TO BE PERFORMED BY SUBCONTRACTOR	TRADE PROJECTED FOR USE BY SUBCONTRACTOR	PROJECTED DOLLAR VALUE OF SUBCONTRACT
Core Electric Comm Corp	Co operation	Electrical	Electrical	\$ 1,120,000.00

\*If subcontractor is presently unknown, please enter the trade (craft name).

**OWNERSHIP CODES**

- W: White
- B: Black
- H: Hispanic
- A: Asian
- N: Native American
- F: Female

**FORM B: PROJECTED WORKFORCE**

**TRADE CLASSIFICATION CODES**

- (J) Journey/level Workers
- (H) Helper
- (TOT) Total by Column
- (A) Apprentice
- (TRN) Trainee

For each trade to be engaged by your company for this project, enter the projected workforce for Males and Females by trade classification on the charts below.

Trade:	MALES					FEMALES				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	White Non-Hisp.	Black Non-Hisp.	Hisp.	Asian	Native Amer.	White Non-Hisp.	Black Non-Hisp.	Hisp.	Asian	Native Amer.
MPAINTERS	1	2					1			
Union Affiliation, if applicable										
LOCAL 79										
Total (Col. #1-10):	4						1			
Total Minority, Male & Female (Col. #2,3,4,5,7,8,9, & 10):		3								
Total Female (Col. #6 - 10):										1

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?

All Employees Hired Are From Local Unions

**FORM B: PROJECTED WORKFORCE**

Trade: \_\_\_\_\_

Carpenters

Union Affiliation, if applicable \_\_\_\_\_

Carpenters Union

Total (Col. #1-10): \_\_\_\_\_

8

Total Minority, Male & Female  
(Col. #2,3,4,5,7,8,9, & 10): \_\_\_\_\_

4

Total Female  
(Col. #6 - 10): \_\_\_\_\_

1

	MALES					FEMALES				
	(1) White Non Hisp.	(2) Black Non Hisp.	(3) Hisp.	(4) Asian	(5) Native Amer.	(6) White Non Hisp.	(7) Black Non Hisp.	(8) Hisp.	(9) Asian	(10) Native Amer.
J	4	2					1			
H										
A		1								
TRN										
TOT	4	3					1			

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?

All Employees Hire are From Local Unions

**FORM C: CURRENT WORKFORCE**

**TRADE CLASSIFICATION CODES**

- (J) Journeylevel Workers
- (H) Helper
- (TOT) Total by Column
- (A) Apprentice (TRN) Trainee

For each trade currently engaged by your company for all work performed in New York City, enter the current workforce for Males and Females by trade classification on the charts below.

Trade:	MALES					FEMALES				
	(1) White Non Hisp.	(2) Black Non Hisp.	(3) Hisp.	(4) Asian	(5) Native Amer.	(6) White Non Hisp.	(7) Black Non Hisp.	(8) Hisp.	(9) Asian	(10) Native Amer.
Mason Traders	15	15								
Union Affiliation, if applicable										
Local 179										
Total (Col. #1-10):	30									
Total Minority, Male & Female (Col. #2,3,4,5,7,8,9, & 10):	6	3	3							
Total Female (Col. #6 - 10):										
TOT	15	18	3							

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?

Employees are Hire From Local Unions As needed

**FORM C: CURRENT WORKFORCE**

Trade: Carpenters

Union Affiliation, if applicable  
Carpenters Union

Total (Col. #1-10):  
24

Total Minority, Male & Female  
(Col. #2,3,4,5,7,8,9, & 10):

11

Total Female  
(Col. #6 - 10):

2

	MALES				FEMALES					
	(1) White Non Hisp.	(2) Black Non Hisp.	(3) Hisp.	(4) Asian	(5) Native Amer.	(6) White Non Hisp.	(7) Black Non Hisp.	(8) Hisp.	(9) Asian	(10) Native Amer.
J	12	6	2				2			
H										
A	1	1								
TRN										
TOT	13	7	2				2			

What are the recruitment sources for you projected hires (i.e., unions, government employment office, job tap center, community outreach)?  
Employees are Hire From Local unions As Needed



**BIDDER'S CERTIFICATION OF COMPLIANCE WITH  
IRAN DIVESTMENT ACT**

Pursuant to General Municipal Law §103-g, which generally prohibits the City from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

[Please Check One]

**BIDDER'S CERTIFICATION**

By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.

I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: August, New York  
8, 20 13

Mark Canellos

SIGNATURE

Mark Canellos

PRINTED NAME

Vice President

TITLE

Sworn to before me this  
8 day of 8, 20 13

Jamie Rivera  
Notary Public

JAMIE RIVERA  
Notary Public State of New York  
Bronx County  
Lic. #01RI6245854  
Comm. Exp. August 8, 2015

Dated: 8/8/13

THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

July 22, 2013

**ADDENDUM No. # 1**

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

**LNEMA08WS**

**Woodstock Library Renovation and ADA Compliance**

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This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

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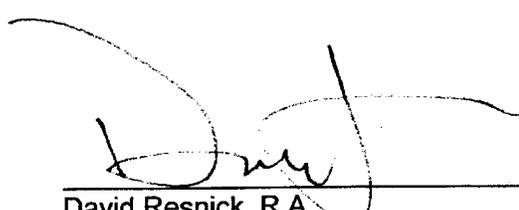
The bidder is advised that the items listed below apply to the project:

1. **Revised Bid Opening Date:**  
The Bid Opening for the Contract described below scheduled for July 23, 2013, at 2:00pm is rescheduled to August 8, 2013 at 2:00pm.  
  
Contract 1 – General Construction Work.
2. **Bidders Questions and Responses to Questions:**  
See Attachment A.
3. **Revisions to Specifications:**  
See Attachment B.
4. **Revisions to Drawings:**  
See Attachment C.
5. **Revisions to the Bid Booklet:**  
See Attachment D.
6. **Revisions to Volume 2:**  
See Attachment E.

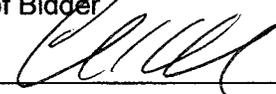
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**THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.**

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.

  
\_\_\_\_\_  
David Resnick, R.A.  
Deputy Commissioner

National Environmental Safety Co., Inc.  
Name of Bidder

By: 

THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

August 1, 2013

**ADDENDUM No. # 2**

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

**LNEMA08WS**

**Woodstock Library Renovation and ADA Compliance**

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This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

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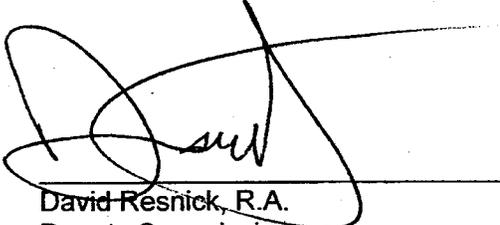
The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**  
See Attachment A.

---

**THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.**

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.  
Deputy Commissioner

National Environmental Safety Co.  
Name of Bidder

By: Muel Lalo R

THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

August 6, 2013

**ADDENDUM No. # 3**

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

**LNEMA08WS**

**Woodstock Library Renovation and ADA Compliance**

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This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

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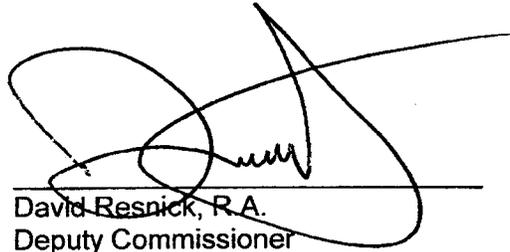
The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**  
See Attachment A.
2. **Revisions to Drawings:**  
See Attachment B.

---

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

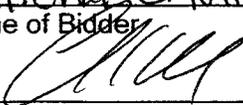
If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



---

David Resnick, P.A.  
Deputy Commissioner

National Environmental Safety Co., Inc.  
Name of Bidder

By: 

## **NOTICE TO BIDDERS:**

- **PROJECT LABOR AGREEMENT:** This contract is subject to a Project Labor Agreement (“PLA”) entered into between the City and the Building and Construction Trades Council of Greater New York (“BCTC”) affiliated Local Unions. By submitting a bid, the Contractor agrees that the PLA is binding on the Contractor and all subcontractors of all tiers. The bidder to be awarded the contract will be required to execute a “Letter of Assent” prior to award.

The Bidder is advised to review the following: (1) Notice regarding the PLA, (2) the PLA, and (3) the Letter of Assent, all of which are set forth at the beginning of Volume 2 of the Contract Documents.

- **SINGLE CONTRACT:** As stated above, this contract is subject to a PLA. The requirements of the Wicks Law for separate prime contractors **DO NOT APPLY** to any project that is covered by a PLA. Accordingly, the requirements of the Wicks Law for separate prime contractors do not apply to this Project. The Project consists of a single contract, the Contract for General Construction Work.

The Bidder is advised to review the Notice set forth at the beginning of Volume 2 of the Contract Documents. The Notice specifies revisions to the Contract Documents to provide that the Project consists of a single contract and to delete any and all references to separate prime contractors.

## **SPECIAL NOTICE TO BIDDERS**

**The New York City Department of Small Business Services (SBS), in conjunction with the New York Business Development Corporation (NYBDC), have established a NYC Construction Loan pilot program to provide prime contractors and subcontractors financing for mobilization costs on certain City construction projects.**

**Under this initiative, loans are available for early stage mobilization needs such as insurance, labor, supplies and equipment. Bidders are strongly encouraged to visit “Growing Your Business” at [www.nyc.gov/nycbusiness](http://www.nyc.gov/nycbusiness) to learn more about the loan or contact [constructionloan@sbs.nyc.gov](mailto:constructionloan@sbs.nyc.gov) / (212) 513-6444 to obtain details and to determine preliminary eligibility.**

**A successful loan applicant will be required to make an assignment of its contract (or subcontract) payments to the lender NYBDC until the loan is repaid. If the loan is to a subcontractor, a prime contractor must honor the terms of such an assignment.**

**A prime contractor may not discriminate against a subcontractor or potential subcontractor by reason of the subcontractor’s participation, or nonparticipation, in the NYC Construction Loan program.**

**BID BOOKLET  
PART A**

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**PROJECT ID: LNEMA08WS**

**CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF STRUCTURES**

**BID BOOKLET**

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**CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF STRUCTURES**

**SPECIAL NOTICE TO BIDDERS**

**BID SUBMISSION REQUIREMENTS**

**THE BID SHALL CONSIST OF TWO (2) SEPARATE, SEALED ENVELOPES. THE DOCUMENTS THAT MUST BE COMPLETED AND INCLUDED IN EACH SEPARATE ENVELOPE ARE LISTED BELOW.**

**BID ENVELOPE #1:** Bid Envelope #1 shall contain the following items:

- Bid Form, including Affirmation
- Bid Security (if required, see page 22)
- MWBE Subcontractor Utilization Plan (if participation goals have been established)

**BID ENVELOPE #2:** Bid Envelope #2 shall contain **ONLY** the following item:

- Bidder's Identification of Subcontractors (see pages 16 & 17)

**FAILURE TO SUBMIT THE FOUR ITEMS LISTED ABOVE  
WILL RESULT IN THE DISQUALIFICATION OF THE BID**

**BID ENVELOPE #1:** In addition to the items listed above, Bid Envelope #1 shall also contain the following items: **DO NOT** Include the items listed below in Bid Envelope #2.

- Bid Breakdown (if required, see page 21)
- Safety Questionnaire
- Construction Employment Report (if bid is \$1,000,000 or more)
- Contract Certificate (if bid is less than \$1,000,000)
- Confirmation of Vendex Compliance
- Bidder's Certification of Compliance with Iran Divestment Act
- Special Experience Requirements Qualification Form (if required, see pages 3, 4)

**FAILURE TO SUBMIT THE SEVEN ITEMS LISTED ABOVE  
MAY RESULT IN THE DISQUALIFICATION OF THE BID.**

- NOTES:**
- ( 1 ) All of the above referred to blank forms to be completed and submitted with the bid are included in the BID BOOKLET.
  - ( 2 ) If additional information is required, please contact DDC at 718-391-2601.
  - ( 3 ) **VENDEX QUESTIONNAIRES:** Vendex Questionnaires, as well as detailed instructions, may be obtained at [www.nyc.gov/vendex](http://www.nyc.gov/vendex). The bidder may also obtain Vendex forms and instructions by contacting the Agency Chief Contracting Officer or the contact person for this contract.
  - ( 4 ) **SPECIAL EXPERIENCE REQUIREMENTS:** The Bidder is advised that Special Experience Requirements may apply to this contract. Such requirements are set forth on pages 3 and 4 of this Bid Booklet.
  - ( 5 ) **SPECIAL EXPERIENCE REQUIREMENTS FOR ASBESTOS:** The Bidder is advised that this contract contains strict requirements regarding the prior experience and licensing of the subcontractor who will perform any required asbestos abatement work. These special experience requirements are set forth in the section of the specifications which describes any required asbestos abatement work.

## Special Notice to Bidders – Proprietary Items

- A. General: A proprietary item required for the Project is specified below. The contractor is required to provide and install such proprietary item. The Contractor must provide the specified item from the designated manufacturer. Substitutions are not permissible and will not be approved. More detailed information regarding the item is set forth in the Specifications. Such information includes item description, as well as requirements for installation and related materials.
- B. Payment: For the required proprietary item, an allowance amount is indicated. The allowance provides a stipulated amount to reimburse the Contractor for the purchase of the proprietary item from the designated manufacturer. Payment from the allowance shall be limited to the purchase price of the specified proprietary item and shall exclude any costs above and beyond the purchase price. Payment from the allowance shall not include any of the following costs with respect to the specified proprietary item: (1) any mark-up for the Contractor's overhead and profit, (2) any costs for transportation, including delivery, shipping or special handling costs, (3) any costs for installation, and (4) any costs for related materials. Payment for the specified proprietary item shall be based on the invoice actually provided by the manufacturer.
- C. Bid Form: A total allowance amount for the purchase of all required proprietary items is set forth on the Bid Form. In preparing the lump sum portion of its bid, the Contractor shall:
- (1) Exclude from its bid any costs for the purchase of the proprietary items, and
  - (2) Include in its bid any costs above and beyond the purchase price, including without limitation, costs for transportation, delivery, installation, related materials and overhead.
- D. Required Proprietary Item(s):

### ARCHITECTURAL:

01. Proprietary Item:	<i>Roof Membrane</i>
Specification Section:	075500
Manufacturer:	CertainTeed Flintlastic GTA-FR with CoolStar: GTA-FR-C-B3
Amount Per Unit:	\$ 140.00 per roll
Quantity:	2
Allowance Amount:	Not to Exceed \$ 280.00

**MECHANICAL:**

01. Proprietary Item: *Web Stat Thermostat*  
Specification Section: 230900  
Manufacturer: *Honeywell: T7350H1009*  
Amount Per Unit: \$ 580.00  
Quantity: 3  
Allowance Amount: Not to Exceed \$ 1,740.00

02. Proprietary Item: *Web Stat Controller*  
Specification Section: 230900  
Manufacturer: *Honeywell: W7350A1000*  
Amount Per Unit: \$ 1,200.00  
Quantity: 1  
Allowance Amount: Not to Exceed \$ 1,200.00

**FIRE ALARM:**

01. Proprietary Item: *Manual Station*  
Specification Section: 283111  
Manufacturer: *G.E. Security EST3: SIGA-270*  
Amount Per Unit: \$ 156.00 (standard), \$ 199.00 (waterproof)  
Quantity: 15 standard + 1 waterproof  
Allowance Amount: Not to Exceed \$ 2,437.00

02. Proprietary Item: *Heat Detector*  
Specification Section: 283111  
Manufacturer: *G.E. Security EST3: SIGA2-HRS*  
Amount Per Unit: \$ 156.00  
Quantity: 5  
Allowance Amount: Not to Exceed \$ 2,340

03. Proprietary Item: *Smoke Detector*  
Specification Section: 283111  
Manufacturer: *G.E. Security EST3: SIGA2-PS*  
Amount Per Unit: \$ 166.00  
Quantity: 51  
Allowance Amount: Not to Exceed \$ 8,466.00

04. Proprietary Item: *Addressable Smoke Detector for Elevator Recall*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: SIGA2-PS*  
 Amount Per Unit: \$ 166.00  
 Quantity: 4  
 Allowance Amount: Not to Exceed \$ 664.00
05. Proprietary Item: *Monitor Module for Sprinkler System Water Flow*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: SIGA-CT1*  
 Amount Per Unit: \$ 161.00  
 Quantity: 2  
 Allowance Amount: Not to Exceed \$ 322.00
06. Proprietary Item: *Monitor Module for Sprinkler System Tamper Switch*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: SIGA-CT1*  
 Amount Per Unit: \$ 161.00  
 Quantity: 2  
 Allowance Amount: Not to Exceed \$ 322.00
07. Proprietary Item: *Heat Detectors in Elevator Shaft and Pit*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: SIGA2-HFS*  
 Amount Per Unit: \$ 156.00  
 Quantity: 3  
 Allowance Amount: Not to Exceed \$ 468.00
08. Proprietary Item: *Addressable Duct Mounted Smoke Detector*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: SIGA-SD with associated sampling tubes*  
 Amount Per Unit: \$ 394.00  
 Quantity: 2  
 Allowance Amount: Not to Exceed \$ 788.00

09. Proprietary Item: *Wall Mounted Combination of Strobe and Horn*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: GIRF-HDVM*  
 Amount Per Unit: \$ 173.00 (standard) + \$ 193.00 (waterproof)  
 Quantity: 29 standard + 1 waterproof  
 Allowance Amount: Not to Exceed \$ 5,210.00
10. Proprietary Item: *Wall Mounted Fire Strobe*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: GIRF-VM*  
 Amount Per Unit: \$ 171.00  
 Quantity: 4  
 Allowance Amount: Not to Exceed \$ 684.00
11. Proprietary Item: *Interface Unit*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: SIGA-CT1*  
 Amount Per Unit: \$ 80.00  
 Quantity: 33  
 Allowance Amount: Not to Exceed \$ 2640.00
12. Proprietary Item: *Control Relay*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: SIGA-CR*  
 Amount Per Unit: \$ 155.00  
 Quantity: 3  
 Allowance Amount: Not to Exceed \$ 465.00
13. Proprietary Item: *Electric Bell*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3: 439D-10AW-R*  
 Amount Per Unit: \$ 119.00  
 Quantity: 1  
 Allowance Amount: Not to Exceed \$ 119.00

14. Proprietary Item: *Fire Alarm Control Panel*  
 Specification Section: 283111  
 Manufacturer: *G.E. Security EST3*  
 Amount Per Unit: \$ 5,000.00 (control panel) + \$1,050.00 (annunciator)  
 Quantity: 1 control panel + 1 annunciator  
 Allowance Amount: \$ 6,050.00 (control panel+annunciator)

**SECURITY:**

1. Proprietary Item: *Access Controller*  
 Specification Section: 281000  
 Manufacturer: *Tyco/Software House: iSTAR Pro 2U - STAR016-2URM*  
 Amount Per Unit: \$ 10,000.00  
 Quantity: 1  
 Allowance Amount: Not to Exceed \$ 10,000.00

2. Proprietary Item: *HID Reader*  
 Specification Section: 281000  
 Manufacturer: *Tyco/Software House: Thin Line II - 140-350-GR*  
 Amount Per Unit: \$ 300.00  
 Quantity: 9  
 Allowance Amount: Not to Exceed \$ 2,700.00

3. Proprietary Item: *RM Card Reader*  
 Specification Section: 281000  
 Manufacturer: *Tyco/Software House: RM2L-PH*  
 Amount Per Unit: \$ 1395.00  
 Quantity: 6  
 Allowance Amount: Not to Exceed \$ 8,370.00

4. Proprietary Item: *USB Control Module*  
 Specification Section: 281000  
 Manufacturer: *American Dynamics: ADACSNET*  
 Amount Per Unit: \$ 395.00  
 Quantity: 1  
 Allowance Amount: Not to Exceed \$ 395.00

5. Proprietary Item: *Digital Video Management System*  
Specification Section: 281000  
Manufacturer: *American Dynamics: Speed Intellex DVMS Deluxe – ADD6R0DVDV100*  
Amount Per Unit: \$ 10,000.00  
Quantity: 1  
Allowance Amount: Not to Exceed \$ 10,000.00
6. Proprietary Item: *LCD Monitor*  
Specification Section: 281000  
Manufacturer: *Belkin: F1DC101P-DR*  
Amount Per Unit: \$ 1801.00  
Quantity: 1  
Allowance Amount: Not to Exceed \$ 1801.00
7. Proprietary Item: *Passive UTP Transceiver Hub*  
Specification Section: 281000  
Manufacturer: *Altronix: HubWay16CD*  
Amount Per Unit: \$ 800.00  
Quantity: 1  
Allowance Amount: Not to Exceed \$ 800.00

**SPECIAL EXPERIENCE REQUIREMENTS**

Special Experience Requirements apply as indicated below.

Bidder:                                      **General Construction**                        X   YES                      \_\_\_\_\_ NO

Specific Areas of Work / Manufacturers:

<b>General Construction</b>	<u>  X  </u>	<b>YES</b>	<u>      </u>	<b>NO</b>
<b>Plumbing Work</b>	<u>      </u>	<b>YES</b>	<u>  X  </u>	<b>NO</b>
<b>HVAC Work</b>	<u>      </u>	<b>YES</b>	<u>  X  </u>	<b>NO</b>
<b>Electrical Work</b>	<u>      </u>	<b>YES</b>	<u>  X  </u>	<b>NO</b>

(A) **EXPERIENCE REQUIREMENTS FOR THE BIDDER:** The special experience requirements set forth below apply to the bidder for the General Construction Contract. Compliance with such special experience requirements will be determined solely by the City prior to an award of contract. Failure to comply with the special experience requirements will result in the rejection of the bid as non-responsive.

(1) The bidder must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work. Such prior projects must have involved facilities determined by the City to be of landmark quality and/or historical significance.

(B) **QUALIFICATION FORM:** For each project submitted to demonstrate compliance with the special experience requirements, the bidder must complete the Qualification Form included in the Bid Booklet. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information on the Qualification Form is provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

(C) **CONDITIONS:** The City may, in determining compliance with the special experience requirements set forth above, consider prior projects completed by principal(s) or other employees of the bidder while affiliated with another entity, subject to the conditions set forth below.

(1) Any principal or other employee on whose prior experience the bidder is relying to demonstrate compliance with these special experience requirements must have held the following: (a) a significant management role in the prior entity with which he/she was affiliated, and (b) a significant management role in the entity submitting the bid for a period of six months or from the inception of the bidding entity. If the bidder is relying on the prior experience of a principal or employee, it must submit documentation confirming the position held by such principal or employee in the prior entity, as well as in the bidding entity.

(2) The bidder may not rely on the experience of its principals or other employees to demonstrate compliance with any other requirements, including without limitation, financial requirements or requirements for a specified minimum amount of annual gross revenues.

(D) **EXPERIENCE REQUIREMENTS FOR SPECIFIC AREAS OF WORK:** The special experience requirements set forth below apply to the contractor or subcontractor who will perform specific areas of work. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of such award, the contractor will be required to submit the qualifications of the contractor or subcontractor who will perform these specific areas of work. If the bidder intends to perform these specific areas of work with its own forces, it must demonstrate compliance with the special experience requirements. If the bidder intends to subcontract these specific areas of work, the proposed subcontractor(s) must demonstrate compliance with the special experience requirements. Once approved, no substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City. The bidder is advised to carefully review these special experience requirements prior to submitting its bid, as such experience requirements will be strictly enforced.

(1) Special experience requirements apply to the specific areas of work set forth below.

(a) Section 03 30 00: Cast-In-Place Concrete

- (b) Section 03 33 00: Architectural Cast-In-Place Concrete
- (c) Section 04 01 00: Masonry Restoration and Cleaning
- (d) Section 05 12 00: Structural Steel
- (e) Section 05 50 00: Miscellaneous Metals
- (f) Section 05 70 10: Ornamental Glass Rail Systems
- (g) Section 05 71 00: Decorative Metal Stairs
- (h) Section 06 40 23: Architectural Woodwork
- (i) Section 07 55 00: Modified Bitumen Roofing
- (j) Section 08 42 28: All Glass Doors and Partitions
- (k) Section 09 01 20: Plaster Restoration
- (l) Section 09 64 00: Wood Strip Flooring

(2) Special experience requirements applicable to the contractor or subcontractor that will perform specific areas of work are summarized below. Such experience requirements are set forth in full in the Addendum to the General Conditions.

- (a) The contractor or subcontractor performing the work of this section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work. Additional requirements are set forth below.
  - For roofing work, the contractor or subcontractor must be licensed or approved by the manufacturer of the roofing system
  - For some specific areas of work, the prior projects completed by the contractor or subcontractor must have involved facilities determined by the City to be of landmark quality and/or historical significance.

(3) For each project submitted to demonstrate compliance with the special experience requirements for specific areas of work, the contractor or proposed subcontractor will be required to complete the Qualification Form included in the Bid Booklet. The City will only evaluate a project if the following criteria are met: (1) the project is described on the Qualification Form, and (2) all information on the Qualification Form is provided. The City will not evaluate any project which does not comply with the criteria set forth herein, including any project which is referred to only on the resume of an individual.

**(E) EXPERIENCE REQUIREMENTS FOR MANUFACTURER(S):** The special experience requirements set forth below apply to the manufacturer who will supply or fabricate specific material or equipment. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of award, the contractor will be required to submit the qualifications of the proposed manufacturer(s). Once approved, no substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City.

(1) Special experience requirements apply to the manufacturer(s) set forth below.

- (a) Section 05 70 10: Ornamental Glass Rail Systems
- (b) Section 08 80 00: Glass and Glazing

(2) Special experience requirements applicable to the manufacturer(s) of specified material or equipment are summarized below. Such experience requirements are set forth in full in the Addendum to the General Conditions.

- (a) The manufacturer providing the material or equipment specified in this section must, for the past five (5) years, have been regularly engaged in the manufacture of material or equipment similar in type to that required for this Project. Such similar material or equipment provided by the manufacturer must have been in satisfactory service for not less than five (5) years.

**Qualification Form**

Project ID: LNEMA08WS

List previous projects completed to meet the special experience requirements for this contract. Please photocopy this form for submission of all required projects.

Name of Contractor: \_\_\_\_\_

Name of Project: \_\_\_\_\_

Location of Project: \_\_\_\_\_

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: \_\_\_\_\_

Title: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Brief description of work completed: \_\_\_\_\_

\_\_\_\_\_

Was the work performed as a prime or a subcontractor: \_\_\_\_\_

Amount of Contract: \_\_\_\_\_

Date of Completion: \_\_\_\_\_

\*\*\*\*\*

Name of Contractor: \_\_\_\_\_

Name of Project: \_\_\_\_\_

Location of Project: \_\_\_\_\_

Owner or Owner's representative (Architect or Engineer) who is familiar with the work performed:

Name: \_\_\_\_\_

Title: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Brief description of work completed: \_\_\_\_\_

\_\_\_\_\_

Was the work performed as a prime or a subcontractor: \_\_\_\_\_

Amount of Contract: \_\_\_\_\_

Date of Completion: \_\_\_\_\_

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## MWBE PROGRAM

### SUBCONTRACTOR UTILIZATION PLAN

**Schedule B: Subcontractor Utilization Plan:** Schedule B: Subcontractor Utilization Plan for this Contract is set forth on the following pages of this Bid Booklet. Schedule B: Subcontractor Utilization Plan (Part I) indicates whether participation goals have been established for this Contract. If participation goals have been established for this Contract, the bidder must submit Schedule B: Subcontractor Utilization Plan (Part II) with its bid.

**Contract Provisions:** Contract provisions regarding the participation of the MWBE firms are set forth in Article 77 of the Contract. The bidder is advised to review these contract provisions.

**Waiver:** The bidder may seek a full or partial pre-award waiver of the Target Subcontracting Percentage in accordance with Article 77 of the Contract (See Part A, Section 10). The bidder's request for a waiver must be submitted at least seven (7) calendar days prior to the bid date. Waiver requests submitted after the deadline will not be considered. The form for requesting a waiver of the Target Subcontracting Percentage is set forth in Schedule B: Subcontractor Utilization Plan (Part III).

**Rejection of the Bid:** The bidder must complete Schedule B: Subcontractor Utilization Plan (Part II) set forth on the following pages. Subcontractor Utilization Plans which do not include the required affirmations (on Page 2) will be deemed to be non-responsive, unless a full waiver of the Target Subcontracting Percentage is granted (Schedule B: Subcontractor Utilization Plan, Part III). In the event that the City determines that the bidder has submitted a Schedule B: Subcontractor Utilization Plan where the required affirmations are completed but other aspects of the Plan are not complete, or contain a copy or computation error that is at odds with the affirmation, the bidder will be notified by the Agency and will be given four (4) calendar days from receipt of notification to cure the specified deficiencies and return a completed plan to the Agency. Failure to do so will result in a determination that the Bid is non-responsive.

Receipt of notification is defined as the date notice is emailed or faxed (if the bidder has provided an email address or fax number), or no later than five (5) days from the date of mailing or upon delivery, if delivered.

**Impact on LBE Requirements:** If goals have been established for the participation of M/WBE's, the contractor is not required to comply with the Locally Based Enterprise Program ("LBE"). The LBE Program is set forth in Article 67 of the Contract.

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Tax ID #: \_\_\_\_\_

PIN#: 8502013LN0002C



Contract # 1 - General Construction Work

The City of New York

**SCHEDULE B - Subcontractor Utilization Plan -Part I: Agency's Target**

This page to be completed by contracting agency

**Contract Overview**

Pin # 8502013LN0002C FMS Project ID#: LNEMA08WS

Project Title Woodstock Branch Library Renovation and ADA Compliance

Contracting Agency Department of Design and Construction

Agency Address 30-30 Thomson Avenue City Long Island City State NY Zip Code 11101

Contact Person Norma Negron Title MWBE Liaison & Compliance Analyst

Telephone # (718) 391-1502 Email negronn@ddc.nyc.gov

**Project Description** (attach additional pages if necessary)

This Project consists of the full renovation of the first and second floor of this historic branch library designed by McKim, Mead and White, as well as two necessary measures to make the library accessible: the insertion of a new elevator and the replacement of an enclosed egress stair with a new open stair. The project scope includes new lighting in the renovated areas, a new sprinkler system for the cellar and around the open stair, improvements to the fire alarm system, ADA compliance, including the installation of an elevator, and upgrades to the building infrastructure and security systems.

**(1) ✓ Target Subcontracting Percentage**

Percentage of total contract dollar value that agency estimates will be awarded to subcontractors in amounts under \$1 million for construction and professional services.

40 %

**Subcontractor Participation Goals**

Complete and enter total for each Construction or Professional Services, or both (if applicable)

Group	Construction	Professional Services
Black American	Unspecified %	%
Hispanic American	Unspecified %	%
Asian American	Unspecified %	No Goal
Caucasian Female	No Goal	%
<b>Total Participation Goals</b>	<b>(2) 20 %</b>	<b>(3) %</b>

\* Note: For this procurement, individual ethnicity and gender goals are not specified. The Total Participation Goals for construction subcontracts may be met by using Black American, Hispanic American or Asian American firms or any combination of such firms.

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Tax ID #: \_\_\_\_\_

PIN#: \_\_\_\_\_

### SCHEDULE B - Subcontractor Utilization Plan – Part II: Bidder/Proposer Subcontracting Plan

This page and the next (Part II herein) are to be completed by the bidder/proposer. **AFFIRMATIONS; Bidder/proposer must check applicable boxes below, affirming compliance with M/WBE requirements.**

Bidder/proposer  AFFIRMS or  DOES NOT AFFIRM [statement below]

It is a material term of the contract to be awarded that, with respect to the total amount of the contract to be awarded, bidder/proposer will award one or more subcontracts for amounts under one million dollars, sufficient to meet or exceed the Target Subcontracting Percentage (as set forth in Part I) unless it obtains a full or partial waiver thereof, and it will award subcontracts sufficient to meet or exceed the Total Participation Goals (as set forth in Part I) unless such goals are modified by the Agency.

- Bidder/proposer  AFFIRMS that it intends to meet or exceed the Target Subcontracting Percentage (as set forth in Part 1); or
- AFFIRMS that it has obtained a full/partial pre-award waiver of the Target Subcontracting Percentage (as set forth in Part I) and intends to award the modified Target Subcontracting Percentage, if any; or
- DOES NOT AFFIRM

#### Section I: Prime Contractor Contact Information

Tax ID # \_\_\_\_\_ FMS Vendor ID # \_\_\_\_\_

Business Name \_\_\_\_\_ Contact Person \_\_\_\_\_

Address \_\_\_\_\_

Telephone # \_\_\_\_\_ Email \_\_\_\_\_

#### Section II: General Contract Information

##### 1. Define the industry in which work is to be performed.

- Construction includes all contracts for the construction, rehabilitation, and/or renovation of physical structures. This category does include CM Build as well as other construction related services such as: demolition, asbestos and lead abatement, and painting services, carpentry services, carpet installation and removal, where related to new construction and not maintenance.
- Professional Services are a class of services that typically require the provider to have some specialized field or advanced degree. Services of this type include: legal, management consulting, information technology, accounting, auditing, actuarial, advertising, health services, pure construction management, environmental analysis, scientific testing, architecture and engineering, and traffic studies, and similar services.

##### a. Type of work on Prime Contract (Check one):

##### b. Type of work on Subcontract (Check all that apply):

- Construction  Professional Services  Construction  Professional Services  Other

##### 2. What is the expected percentage of the total contract dollar value that you expect to award to all subcontracts?

\_\_\_\_\_ %

##### 3. Will you award subcontract(s) in amounts below \$ 1 million for construction and/or professional services contracts within the first 12 months of the notice to proceed on the contract?

- Yes  No

#### Section III: Subcontractor Utilization Summary

**IMPORTANT: If you do not anticipate that you will subcontract at the target level the agency has specified, because you will perform more of the work yourself, you must seek a waiver of the Target Subcontracting Percentage by completing p. 9).**

Step 1:	Subcontracts under \$1M (4) (construction/professional services)	Total Bid/Proposal Value	Calculated Target Subcontracting Percentage
Calculate the percentage (of your total bid) that will go towards subcontracts under \$1M for construction and/or professional services	\$ _____	\$ _____	_____ %
		÷	x 100 =

- Subcontracts under \$1M (construction/professional services):** Enter the value you expect to award to subcontractors in dollars for amounts under \$1 million for construction and/or professional services. This value defines the amount that participation goals apply to, and will be entered into the first line of Step 2.
- Total Bid/Proposal Value:** Provide the dollar amount of the bid/proposal.
- Calculated Target Subcontracting Percentage:** The percentage of the total contract dollar value that will be awarded to one or more subcontractors for amounts under \$1 million for construction and/or professional services. **This percentage must equal or exceed the percentage listed by the agency on page 1, at line (1).**

**NOTE: The "Calculated Target Subcontracting Percentage" MUST equal or exceed the Target Subcontracting Percentage listed by the agency on Page 6, Line (1).**

Tax ID #: \_\_\_\_\_

PIN#: \_\_\_\_\_

**SCHEDULE B - cont.**

**Step 2:**

Calculate value of subcontractor participation goals

**Subcontracts under \$1M**  
(construction/professional services)

a. Copy value from Step 1, line (4) – the total value of all expected subcontracts under \$1M for construction and/or professional services



b. \* From line a. above, allocate the dollar value of "Subcontracts under \$1M" by Construction and Professional Services,

**Construction**

**Professional Services**

\* If all subcontracts under \$1M are in one industry, enter '0' for the industry with no subcontracts.

\* Amounts listed on these lines should add up to the value from line a.

**Subcontracts under \$1M by Industry** \$ \_\_\_\_\_

\$ \_\_\_\_\_

\* For Construction enter percentage from line (2) from Page 6.

\* For Professional Services enter percentage from line (3) from Page 6.

c. \* **Total Participation Goals Percentages must be copied from Part I, lines (2) and (3).**

**Total Participation Goals** x \_\_\_\_\_ %

x \_\_\_\_\_ %

d. **Value of Total Participation Goals** \$ \_\_\_\_\_

\$ \_\_\_\_\_

**Step 3:**

*Enter brief description of type(s) of subcontracts in amounts under \$1M anticipated, by type of work, not by name of subcontractor*

**Subcontracts in Amounts Under \$1 M Scope of Work – Construction**

*Enter brief description of type(s) of subcontracts in amounts under \$1M anticipated, by type of work, not by name of subcontractor*

**Subcontracts in Amounts Under \$1 M Scope of Work – Professional Services**

**Section IV: Vendor Certification and Required Affirmations**

*I hereby 1) acknowledge my understanding of the M/WBE requirements as set forth herein and the pertinent provisions of Local Law 129 of 2005, and the rules promulgated thereunder; 2) affirm that the information supplied in support of this subcontractor utilization plan is true and correct; 3) agree, if awarded this Contract, to comply with the M/WBE requirements of this Contract and the pertinent provisions of Local Law 129 of 2005, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this contract; 4) agree and affirm that it is a material term of this contract that the Vendor will award subcontract(s) sufficient to meet the Target Subcontracting Percentage, unless a waiver is obtained, and the Vendor will award subcontract(s) sufficient to meet the Total Participation Goals unless such goals are modified by the Agency; and 5) agree and affirm, if awarded this contract the Vendor intends to make all reasonable, good faith efforts to meet the Target Subcontracting Percentage, or If the Vendor has obtained a waiver, the Vendor intends to meet the modified Target Subcontracting Percentage, if any, and the Vendor intends to to solicit and obtain the participation of M/WBEs so as to meet the Total Participation Goals unless modified by the Agency.*

Signature \_\_\_\_\_

Date \_\_\_\_\_

Print Name \_\_\_\_\_

Title \_\_\_\_\_

Tax ID #: \_\_\_\_\_

PIN#: \_\_\_\_\_

### SCHEDULE B

#### PART III - REQUEST FOR WAIVER OF TARGET SUBCONTRACTING PERCENTAGE

##### Contract Overview

Tax ID # \_\_\_\_\_ FMS Vendor ID # \_\_\_\_\_  
 Business Name \_\_\_\_\_  
 Contact Name \_\_\_\_\_ Telephone # \_\_\_\_\_ Email \_\_\_\_\_  
 Type of Procurement  Competitive Sealed Bids  Other Bid/Response Due Date \_\_\_\_\_

PIN # (for this procurement) \_\_\_\_\_ Type of work on Prime Contract (Check one):  
 Construction  Professional Services  
 Type of work on Subcontract (Check all that apply):  
 Construction  Professional Services  Other

**SUBCONTRACTING as described in bid/solicitation documents (Copy this % figure from Subcontractor Utilization Plan, Part I, line \_\_\_\_\_)**  
 \_\_\_\_\_ % of the total contract value anticipated by the agency to be subcontracted for construction/professional services subcontracts valued below \$1 million (each)

**ACTUAL SUBCONTRACTING as anticipated by vendor seeking waiver**  
 \_\_\_\_\_ % of the total contract value anticipated in good faith by the bidder/proposer to be subcontracted for construction/ professional services subcontracts valued below \$1 million (each)

##### Basis for Waiver Request: Check appropriate box & explain in detail below (attach additional pages if needed)

- Vendor does not subcontract construction/professional services, and has the capacity and good faith intention to perform all such work itself.
- Vendor subcontracts some of this type of work but at lower % than bid/solicitation describes, and has the capacity and good faith intention to do so on this contract.
- Other \_\_\_\_\_

##### References

List 3 most recent contracts/subcontracts performed for NYC agencies (if any)

CONTRACT NO.	AGENCY	DATE COMPLETED
_____	_____	_____
_____	_____	_____
_____	_____	_____

List 3 most recent contracts/subcontracts performed for other agencies/entities (complete ONLY if vendor has performed fewer than 3 NYC contracts)

TYPE OF WORK	AGENCY/ENTITY	DATE COMPLETED
_____	_____	_____
Manager at agency/entity that hired vendor (Name/Phone No.)	_____	_____
_____	_____	_____
Manager at agency/entity that hired vendor (Name/Phone No.)	_____	_____
_____	_____	_____
Manager at agency/entity that hired vendor (Name/Phone No.)	_____	_____

**VENDOR CERTIFICATION:** I hereby affirm that the information supplied in support of this waiver request is true and correct, and that this request is made in good faith.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

##### Shaded area below is for agency completion only

##### AGENCY CHIEF CONTACTING OFFICER APPROVAL

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

##### CITY CHIEF PROCUREMENT OFFICER APPROVAL

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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**BID FORM  
THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF STRUCTURES**

**BID FOR FURNISHING ALL LABOR AND  
MATERIAL NECESSARY AND REQUIRED FOR:**

**PROJECT ID: LNEMA08WS**

**Woodstock Branch Library Renovation and ADA Compliance  
761 East 160th Street  
Bronx 10456**

Name of Bidder: \_\_\_\_\_

Date of Bid Opening: \_\_\_\_\_

Bidder is: (Check one, whichever applies)    Individual ( )    Partnership ( )    Corporation ( )

Place of Business of Bidder: \_\_\_\_\_

Bidder's Telephone Number: \_\_\_\_\_ Bidder's Fax Number: \_\_\_\_\_

Bidder's Email Address: \_\_\_\_\_

Residence of Bidder (If Individual): \_\_\_\_\_

If Bidder is a Partnership, fill in the following blanks:

Names of Partners	Residence of Partners
_____	_____
_____	_____
_____	_____

If Bidder is a Corporation, fill in the following blanks:

Organized under the laws of the State of \_\_\_\_\_

Name and Home Address of President: \_\_\_\_\_

Name and Home Address of Secretary: \_\_\_\_\_

Name and Home Address of Treasurer: \_\_\_\_\_

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## BID FORM

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The above-named Bidder affirms and declares:

1. The said bidder is of lawful age and the only one interested in this bid; and no person, firm or corporation other than hereinbefore named has any interest in this bid, or in the Contract proposed to be taken.
2. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief: (1) the prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (2) unless otherwise required by law, the prices quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and (3) no attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.
3. No councilman or other officer or employee or person whose salary is payable in whole or in part from the City Treasury is directly or indirectly interested in this bid, or in the supplies, materials, equipment, work or labor to which it relates, or in any of the profits thereof.
4. The bidder is not in arrears to the City of New York upon debt or contract or taxes, and is not a defaulter, as surety or otherwise, upon any obligation of the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York or State of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except as set forth on the Affirmation included as page 17 of this Bid Booklet.

The bidder hereby affirms that is has paid all applicable City income, excise and other taxes for all years it has conducted business activities in New York City.

5. The bidder, as an individual, or as a member, partner, director or officer of the bidder, if the same be a firm, partnership or corporation, executes this document expressly warranting and representing that should this bid be accepted by the City and the Contract awarded to him, he and his subcontractors engaged in the performance:
  - (1) will comply with the provisions of Section 6-108 of the Administrative Code of the City of New York and the non-discrimination provisions of Section 220a of the New York State Labor Law, as more expressly and in detail set forth in the Agreement;
  - (2) will comply with Section 6-109 of the Administrative Code of the City of New York in relation to minimum wages and other stipulations as more expressly and in detail set forth in the Agreement;
  - (3) have complied with the provisions of the aforesaid laws since their respective effective dates, and
  - (4) will post notices to be furnished by the City, setting forth the requirements of the aforesaid laws in prominent and conspicuous places in each and every plant, factory, building and structure where employees engaged in the performance of the Contract can readily view it, and will continue to keep such notices posted until the supplies, materials and equipment, or work labor and services required to be furnished or rendered by the Contractor have been finally accepted by the City. In the event of any breach or violation of the foregoing, the Contractor may be subject to damages, liquidated or otherwise, cancellation of the Contract and suspension as a bidder for a period of three years. (The words, "the bidder", "he", "his", and "him" where used shall mean the individual bidder, firm, partnership or corporation executing this bid).

6. Compliance Report

The bidder, as an individual, or as a member, partner, director, or officer of the bidder, if the same be a firm, partnership, or corporation, (1) represents that his attention has been specifically drawn to Executive Order No. 50, dated April 25, 1980, on Equal Employment Compliance of the contract, and (2) warrants that he will comply with the provisions of Executive Order No. 50. The Employment Report must be submitted as part of the bid.

The bidder, as an individual, or as a member, partner, director, or officer of the bidder, if the same be a firm, partnership, or corporation, executes this document expressly warranting that he will comply with: (1) the provision of the contract on providing records, Chapter 8.

7. By submission of this bid, the bidder certifies that it now has and will continue to have the financial capability to fully perform the work required for this contract. Any award of this contract will be made in reliance upon such certification. Upon request therefor, the bidder will submit written verification of such financial capability in a form that is acceptable to the department.

8. In accordance with Section 165 of the State Finance Law, the bidder agrees that tropical hardwoods, as defined in Section 165 of the State Finance Law, shall not be utilized in the performance of this Contract, except as the same are permitted by the foregoing provision of law.

9. The bidder has visited and examined the site of the work and has carefully examined the Contract in the form approved by the Corporation Counsel, and will execute the Contract and perform all its items, covenants and conditions, and will provide, furnish and deliver all the work, materials, supplies, tools and appliances for all labor and materials necessary or required for the hereinafter named work, all in strict conformity with the Contract, for the prices set forth in the Bid Schedule:

**BID FORM**

---

**PROJECT ID: LNEMA08WS**

**TOTAL BID PRICE:** In the space provided below, the Bidder shall indicate the total bid price in figures.

- A. **LUMP SUM PRICE** - Total price for all labor and material for all required work, excluding items (B) and (C) set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price For  
Labor

Total Price for Material  
Sold and Delivered

\$ \_\_\_\_\_ + \$ \_\_\_\_\_ Total Price for Item A \$ \_\_\_\_\_

- B. **ALLOWANCE** for Incidental Asbestos Abatement (Section 028013 of the Specifications) \$30,000.00

- C. **AMOUNT** for Proprietary Items (pages 2a - 2f) \$68,261.00

TOTAL BID PRICE (Add A + B + C)  
( a/k/a BID PROPOSAL) \$ \_\_\_\_\_

**BIDDER'S SIGNATURE AND AFFIDAVIT**

**WARNING!!** Failure to comply with items below will result in the rejection of your bid.

- \* **SUBCONTRACTORS:** You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (See Page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". \_\_\_\_\_ Yes  
\_\_\_\_\_ No

- \* **MWBE GOALS:** You MUST complete and submit the Affirmations contained in the Subcontractor Utilization Plan (See Page 7), or a pre-approved waiver (See Page 9), at the time you submit your bid. You must submit the Affirmations (or a pre-approved waiver) in BID ENVELOPE #1.

Bidder: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature of Partner or corporate officer)

Attest:  
(Corporate Seal)

Secretary of Corporate Bidder

Affidavit on the following page should be subscribed  
and sworn to before a Notary Public

**THIS PAGE INTENTIONALLY LEFT BLANK**

**BID FORM (TO BE NOTARIZED)**

\*\*\*\*\*

**AFFIDAVIT WHERE BIDDERS IS AN INDIVIDUAL**

STATE OF NEW YORK, COUNTY OF \_\_\_\_\_ ss:

\_\_\_\_\_ being duly sworn says:

I am the person described in and who executed the foregoing bid, and the several matters therein stated are in all respects true.

\_\_\_\_\_  
(Signature of the person who signed the Bid)

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_,

\_\_\_\_\_  
Notary Public

\*\*\*\*\*

**AFFIDAVIT WHERE BIDDERS IS A PARTNERSHIP**

STATE OF NEW YORK, COUNTY OF \_\_\_\_\_ ss:

\_\_\_\_\_ being duly sworn says:

I am a member of \_\_\_\_\_ the firm described in and which executed the foregoing bid. I subscribed the name of the firm thereto on behalf of the firm, and the several matters therein stated are in all respects true.

\_\_\_\_\_  
(Signature of Partner who signed the Bid)

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_,

\_\_\_\_\_  
Notary Public

\*\*\*\*\*

**AFFIDAVIT WHERE BIDDERS IS A CORPORATION**

STATE OF NEW YORK, COUNTY OF \_\_\_\_\_ ss:

\_\_\_\_\_ being duly sworn says:

I am the \_\_\_\_\_ of the above named corporation whose name is subscribed to and which executed the foregoing bid. I reside at \_\_\_\_\_.

I have knowledge of the several matters therein stated, and they are in all respects true.

\_\_\_\_\_  
(Signature of Corporate Officer who signed the Bid)

Subscribed and sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_,

\_\_\_\_\_  
Notary Public

**AFFIRMATION**

The undersigned bidder affirms and declares that said bidder is not in arrears to the City of New York upon debt, contract or taxes and is not a defaulter, as surety or otherwise, upon obligation to the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York, nor is there any proceeding pending relating to the responsibility or qualification of the bidder to receive public contracts except \_\_\_\_\_

\_\_\_\_\_  
(If none, the bidder shall insert the word "None" in the space provided above.)

Full Name of Bidder: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

**CHECK ONE BOX AND INCLUDE APPROPRIATE NUMBER:**

A - Individual or Sole Proprietorship \*  
SOCIAL SECURITY NUMBER

-----

B - Partnership, Joint Venture or other unincorporated organization  
EMPLOYER IDENTIFICATION NUMBER

-----

C - Corporation  
EMPLOYER IDENTIFICATION NUMBER

-----

By: \_\_\_\_\_  
Signature:

Title: \_\_\_\_\_

If a corporation, place seal here

This affirmation must be signed by an officer or duly authorized representative.

\* Under the Federal Privacy Act the furnishing of Social Security Numbers by bidders on City contracts is voluntary. Failure to provide a Social Security Number will not result in a bidder's disqualification. Social Security Numbers will be used to identify bidders, proposers or vendors to ensure their compliance with laws, to assist the City in enforcement of laws, as well as to provide the City a means of identifying of businesses which seek City contracts.

## BIDDER'S IDENTIFICATION OF SUBCONTRACTORS

### NOTICE TO BIDDERS

**SUBMISSION:** The Bidder must, at the time of the bid, submit the form on the next page ("BIDDER'S IDENTIFICATION OF SUBCONTRACTORS"). This form must be submitted in a separate, sealed envelope (BID ENVELOPE #2). Failure to do so will result in the disqualification of the bid as non-responsive.

\*\*\*\*\*

Please be advised that pursuant to GML § 101(5) the Bidder is required to submit with its bid the names of subcontractors it intends to use to perform the following work on this contract, as well as the agreed-upon amount to be paid to each:

- plumbing and gas fitting;
- steam heating, hot water heating, ventilating and air conditioning apparatus; and
- electric wiring and standard illuminating fixtures.

**NOTE:** This project may not involve all of the above listed subcontractors. Please see the form on the next page which indicates the subcontractors required for this Project.

The list of subcontractors is to be submitted in a separate sealed envelope by completing the form on the next page entitled "Bidder's Identification of Subcontractors". This form provides for the identification of any subcontractors intended to be used in any of the three trades listed above. If bidder intends to use its own forces for any of the above listed work, bidder should so indicate on the form.

**Failure to submit the completed form on the next page ("Bidder's Identification of Subcontractors") that includes the names of subcontractors and the agreed upon amounts to be paid to such subcontractors will render the bid non-responsive.**

**PLEASE NOTE:** for any contract that is subject to M/WBE participation goals under Local Law 129, if the bidder's intention to use its own forces to do any of the above-referenced work would result in Bidder's failure to attain the Target Subcontracting Percentage identified in the Subcontractor Utilization Plan, the bid will be non-responsive unless the bidder requests and obtains a Waiver of Target Subcontracting Percentage (Subcontractor Utilization Plan, Part III) in advance of bid submission.

After the low bid is announced, the sealed list submitted by the low bidder will be opened and the names of the subcontractors will be announced. The sealed lists of subcontractors submitted by all other bidders shall be maintained by the Agency unopened unless such bidder shall become the low bidder (e.g., the initial low bidder is found non-responsive). All unopened lists of subcontractors shall be returned to the bidders unopened after contract award, unless the bidder has given the agency permission to shred the form.

After bid submission, any change of subcontractor or agreed-upon amount to be paid to each shall require approval of the Agency upon a showing of a legitimate construction need which shall include, but not be limited to, a change in project specifications, a change in project material costs, a change to subcontractor status as determined pursuant to §222 (2)(e) of the Labor Law, or if the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract.

**BIDDER'S IDENTIFICATION OF SUBCONTRACTORS**

Project ID: LNEMA08WS

**SUBMISSION:** In addition to its Bid (Bid Envelope # 1), the Bidder must, at the time of the bid, complete and submit this form in a separate, sealed envelope (Bid Envelope # 2). To complete this form, the Bidder must identify the subcontractors it intends to use for the work listed below, as well as the dollar amount to be paid to each subcontractor. Failure to complete this form and submit it in a separate, sealed envelope will result in the disqualification of the bid as non-responsive.

The Bidder intends to use the following subcontractors. If the Bidder intends to do any of the work referenced below with its own forces, the Bidder should complete this form using its own name. If multiple subcontractors for any trade are proposed, Bidder may submit multiple copies of this form.

1. **PLUMBING CONTRACTOR:**

\_\_\_\_\_  
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ \_\_\_\_\_

2. **HVAC CONTRACTOR:**

\_\_\_\_\_  
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ \_\_\_\_\_

3. **ELECTRICAL CONTRACTOR:**

\_\_\_\_\_  
(Print Name)

Agreed Amount To Be Paid To Subcontractor: \$ \_\_\_\_\_

**BIDDER'S SIGNATURE:** The Bidder must sign this form in the space provided below:

Name of Bidder: \_\_\_\_\_

By: \_\_\_\_\_  
Signature of Partner or Corporate Officer

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

BID BOND 1  
FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS. That we, \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Principal", and \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Surety" are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "CITY", or to its successors and assigns in the penal sum of \_\_\_\_\_  
\_\_\_\_\_

(\$ \_\_\_\_\_), Dollars lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the Principal is about to submit (or has submitted) to the City the accompanying proposal, hereby made a part hereof, to enter into a contract in writing for \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall not withdraw said Proposal without the consent of the City for a period of forty-five (45) days after the opening of bids and in the event of acceptance of the Principal's Proposal by the City, if the Principal shall:

(a) Within ten (10) days after notification by the City, execute in quadruplicate and deliver to the City all the executed counterparts of the Contract in the form set forth in the Contract Documents, in accordance with the proposal as accepted, and

(b) Furnish a performance bond and separate payment bond, as may be required by the City, for the faithful performance and proper fulfillment of such Contract, which bonds shall be satisfactory in all respects to the City and shall be executed by good and sufficient sureties, and

(c) In all respects perform the agreement created by the acceptance of said Proposal as provided in the Information for Bidders, bound herewith and made a part hereof, or if the City shall reject the aforesaid Proposal, then this obligation shall be null and void; otherwise to remain in full force and effect.

BID BOND 2

In the event that the Proposal of the Principal shall be accepted and the Contract be awarded to him the Surety hereunder agrees subject only to the payment by the Principal of the premium therefore, if requested by the City, to write the aforementioned performance and payment bonds in the form set forth in the Contract Documents.

It is expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

There shall be no liability under this bond if, in the event of the acceptance of the Principal's Proposal by the City, either a performance bond or payment bond, or both, shall not be required by the City on or before the 30th day after the date on which the City signs the Contract.

The surety, for the value received, hereby stipulates and agrees that the obligations of the Surety and its bond shall in no way be impaired or affected by any postponements of the date upon which the City will receive or open bids, or by any extensions of time within which the City may accept the Principal's Proposal, or by any waiver by the City of any of the requirements of the Information for Bidders, and the Surety hereby waives notice of any such postponements, extensions, or waivers.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

(Seal)

\_\_\_\_\_  
Principal (L.S.)

By: \_\_\_\_\_

(Seal)

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

BID BOND 3

ACKNOWLEDGEMENT OF PRINCIPAL, IF A CORPORATION

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:  
On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally came  
\_\_\_\_\_ to me known, who, being by me duly sworn, did depose and say that he  
resides at \_\_\_\_\_  
that he is the \_\_\_\_\_ of \_\_\_\_\_  
the corporation described in and which executed the foregoing instrument; that he knows the seal of said  
corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the  
directors of said corporation, and that he signed his name thereto by like order.

\_\_\_\_\_  
Notary Public

ACKNOWLEDGEMENT OF PRINCIPAL, IF A PARTNERSHIP

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:  
On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally appeared  
\_\_\_\_\_ to me known and known to me to be one of the members of the firm of  
\_\_\_\_\_ described in and who executed the foregoing instrument, and he  
acknowledged to me that he executed the same as and for the act and deed of said firm.

\_\_\_\_\_  
Notary Public

ACKNOWLEDGEMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:  
On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally appeared  
\_\_\_\_\_ to me known and known to me to be the person described in and who  
executed the foregoing instrument and acknowledged that he executed the same.

\_\_\_\_\_  
Notary Public

AFFIX ACKNOWLEDGEMENTS AND JUSTIFICATION OF SURETIES

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## BID BREAKDOWN

**Submission:** Bidders are advised that the requirement to submit a Bid Breakdown applies to each contract for which an "X" is indicated before the word "Yes". If required, the bidder must submit, with its bid, a completed Bid Breakdown. Failure to provide a completed Bid Breakdown may result in rejection of the bid as non-responsive.

    X          YES                                      NO

### Limitations on Use of Bid Breakdown:

Bidders are advised that the Bid Breakdown shall be used for bid analysis purposes only and shall not be binding for any other purposes under the Contract, including, without limitation, for payment purposes or in connection with a contractor claim for extra work. If the form for the Bid Breakdown does not include an item of work required by the Contract Documents, such omission shall have no effect whatsoever, nor shall it be used by the contractor in connection with a claim for extra work (i.e., work for which the contractor is entitled to a change order).

### Instructions for Preparing Bid Breakdown:

- (A) The Bid Breakdown is set forth on the following pages of this Bid Booklet and is in accordance with the Construction Specification Institute (CSI) format. For all items of work listed in the Bid Breakdown, the bidder must indicate the price for labor and the price for material, as well as the estimated quantities required.
- (B) In preparing its Bid Breakdown, the bidder shall submit prices that include all costs for overhead and profit. Overhead shall include, without limitation, all costs in connection with the following: administration, management, superintendence, small tools, insurance, bonds, and provision of services or items required by the General Conditions [except for Security/Fire Guard Services and Temporary Heat]. If the Project requires Security/Fire Guard Services and/or Temporary Heat, such service(s) will be included as separate line items in the Bid Breakdown.
- (C) If an item is set forth in the Bid Breakdown, but is not included in the Contract Documents (Drawings, Specifications, General Conditions, and/or Addenda), the bidder is advised to leave the item blank and exclude the cost of the item from its grand total. In an attachment to its Bid Breakdown, the bidder shall provide a list of all items left blank.
- (D) If an item is not set forth in the Bid Breakdown, but is included in the Contract Documents (Drawings, Specifications, General Conditions, and/or Addenda), the bidder is advised to add the item to its Bid Breakdown and include the cost of the item in its grand total. In an attachment to its Bid Breakdown, the bidder shall provide a list of all items added.

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NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

**CONTRACTOR BID BREAKDOWN FORM**

PROJECT TITLE: NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
 PROJECT LOCATION: 761 160th Street, Bronx, New York 10465  
 BIDDER: LNEMA08WS  
 FMS ID NUMBER: NYPL  
 CLIENT AGENCY: NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
<b>CONTRACT 1 - GENERAL CONSTRUCTION WORK</b>								
001000	<b>DIVISION 1 - GENERAL REQUIREMENTS</b>							
	<b>MOBILIZATION</b>							
	Temporary utilities		LS					
	Sidewalk bridge		LS					
	Interior scaffolding		LF					
017419	<i>Construction Waste Requirements</i>		LS					
018113	<i>Sustainable Design Requirements</i>		LS					
018119	<i>Construction IAQ Requirements</i>		LS					
019100	<i>General Commissioning Requirements</i>		LS					
	subtotal							
<b>DIVISION 2 - EXISTING CONDITIONS</b>								
002000	<i>Selective Demolition and Alteration Work</i>							
024119	<b>Basement</b>							
	Take down and set aside for re-use mechanical extract louver on GL 1 a-b		EA					
	Take down and cart-away existing door, frame and architraves		EA					
	Take down and cart-away drywall / partitions		LF					
	Form door opening in existing partition and make good surrounds		EA					
	Take down and cart away stairs and make good		FLIGHT					
	Cut ground floor slab to enable forming of new lift pit		SF					
	Cut ground floor slab to enable removal and relocation of waste line		LF					
	Remove waste line		LF					
	Demolition of existing dumb waiter; removal doors and all conveying equipment		EA					
	Remove upper portion of window on GL 7 b-c and prepare for new mechanical louver		LS					

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761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
024119	Remove elevator sump pump		EA					
	Remove radiator (to be relocated)		EA					
	Remove HW pipe		LF					
	Remove ductwork		LF					
	Remove multi zone Ac unit		EA					
	Remove MEP items		SF					
	Miscellaneous electrical demolition: remove equipment, wiring and associated conduit		LS					
	<b>Ground level</b>							
	Take down and cart away granite saddle / threshold; protect adjacent building fabric		EA					
	Take down, set aside for reuse and reinstall historic plaque		EA					
	Allow for temporary protection of external lanterns		PAIR					
	Take down and cart away stairs		FLIGHT					
	Remove structural concrete encased steel beams		LF					
	Temporary shoring concrete slab - below beam removed		LF					
	Removal of floor slab; measure on plan, make good as required		SF					
	Take up and cart away existing carpet, adhesives and associated sundries		SF					
	Remove existing ceiling @ area to be repair		SF					
	Demolition of existing dumb waiter shaft		EA					
	Take up floor tiles from restrooms and make good slab to received new finish		SF					
	Take down, cart away and make good windows on first floor north elevation		SF					
	Strip of built in millwork and the like		SF					
	Remove existing column encasements; ensuring no damage to existing columns and protect until new encasements have been installed.		EA					
	Localised removal of terracotta wall tiles to enable installation of new structural elements of stairs		LS					

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**CONTRACTOR BID BREAKDOWN FORM**

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NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION

FMS ID NUMBER LNEMA08WS

PROJECT LOCATION

761 160th Street, Bronx, New York 10465

CLIENT AGENCY

NYPL

BIDDER:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
024119	Remove window shade		EA					
	Remove window sill		LF					
	Remove exterior wall below window removed		SF					
	Remove existing interior single door & frame		EA					
	Remove interior CMU / Drywall partition		LF					
	Concrete slab opening: remove concrete slab & reinforcement		SF					
	Saw cut existing concrete slab to be removed		LF					
	Temporary shoring concrete slab - around opening		LF					
	New pipe penetration		EA					
	Remove existing step flooring		LS					
	Remove existing toilet & associated piping		EA					
	Remove existing lavatory & associated piping		EA					
	Remove existing janitor sink & associated piping		EA					
	Remove toilet accessories		EA					
	Remove exg. convectors (cover). Prepare for installation of new cover		EA					
	Remove exg. convectors (fin tube & cover).		EA					
	Remove exg. convectors (fin tube & cover). Cap piping		EA					
Remove HW pipe		LF						
Remove pendant fixture		EA						
Remove wall mounted fixture		LF						
Remove smoke detector		EA						
Remove clock and SIM		EA						
Remove all existing conduit and telecom wiring on north facade		LS						
Miscellaneous electrical demolition: remove equipment, wiring and associated conduit		LS						
Relocation of HW piping above ceiling at first floor windows								
Removals								

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761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
024119	Remove ceiling		LF					
	Remove existing ceiling trim		LF					
	Remove HW pipes		LF					
	<b>Mezzanine</b>							
	Saw cut existing concrete slab to be removed		LF					
	Temporary shoring concrete slab - around opening		LF					
	Remove existing beam		LF					
	Temporary shoring concrete slab - below beam removed		LF					
	Remove ductwork		LF					
	Remove MEP items		SF					
	Remove existing column encasements; ensuring no damage to existing columns and protect until new encasements have been installed.		EA					
	Take down and cart away stairs		FLIGHT					
	Localised removal of terracotta wall tiles to enable installation of new structural elements of stairs		LS					
	Demolition of existing dumb waiter shaft		LS					
	Removal of floor slab; measure on plan, make good as required		SF					
	Demolition of existing masonry riser shaft and make good floor and ceiling		LS					
	<b>Second floor</b>							
	Remove existing single door & frame		EA					
	Remove existing double door & frame		EA					
	Remove window shade		EA					
	Remove 3 x 5 window @ storage		EA					
	Remove CMU / Drywall partition		LF					
	Removal of floor slab; measure on plan, make good as required		SF					
	Saw cut existing concrete slab to be removed		LF					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
024119	Temporary shoring concrete slab - around opening		LF					
	Remove existing beam		LF					
	Temporary shoring concrete slab - below beam removed		LF					
	Remove existing stairs & associated enclosure & anchors		FLIGHT					
	Remove existing tile flooring @ toilets		SF					
	Remove existing toilet & associated piping		EA					
	Remove existing lavatory & associated piping		EA					
	Remove existing janitor sink & associated piping		EA					
	Remove toilet accessories		EA					
	Remove exg. convectors (cover). Prepare for installation of new cover		EA					
	Remove exg. convectors (fin tube & cover).		EA					
	Remove HW pipes		LF					
	Remove ductwork		LF					
	Remove MEP items		SF					
	Remove pendant fixture		LF					
	Miscellaneous electrical demolition: remove equipment, wiring and associated conduit		LS					
	Strip of built in millwork and the like		LS					
	Take up and cart away existing carpet, adhesives and associated sundries		SF					
	Take down and cart away stairs and make good		FLIGHT					
	Localised removal of terracotta wall tiles to enable installation of new structural elements of stairs		LS					
	Demolition of existing dumb waiter shaft		LS					
	Take up floor tiles from restrooms and make good slab to received new finish		SF					
	Localized demolition of ceiling, walls for installation of new ductwork and make good.		LS					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
024119	Remove existing column encasements; ensuring no damage to existing columns and protect until new encasements have been installed. Approximate height of columns Protect existing historic fireplace throughout the duration of the work Demolition of existing masonry riser shaft <b>Third floor</b> Remove existing single door & frame Remove CMU / Drywall partition Concrete slab opening: remove concrete slab & reinforcement Saw cut existing concrete slab to be removed Temporary shoring concrete slab - around opening Remove existing beam Temporary shoring concrete slab - below beam removed Remove existing flooring @ area to be repair Remove existing tile flooring @ toilets Remove existing ceiling @ area to be repair Remove existing toilet & associated piping Remove existing lavatory & associated piping Remove toilet accessories Remove exg. convectors (fin tube & cover) to be relocated Remove ductwork Remove MEP items Miscellaneous electrical demolition: remove equipment, wiring and associated conduit Localised removal of terracotta wall tiles to enable installation of new structural elements of stairs Demolition of existing dumb waiter shaft Demolition of existing masonry riser shaft		EA LS LS EA LF SF LF LF LF LF SF SF SF EA EA EA LF SF LS LS EA EA					

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NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER LNEMA08WS  
CLIENT AGENCY NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
024119	Take down and cart-away existing door, frame and architraves		EA					
	Remove toilet accessories		LS					
	Localized demolition of ceiling, walls for installation of new ductwork and make good.		LS					
	<b>Roof level</b>							
	Remove existing access door and associated bulkhead		EA					
	Concrete slab opening: remove concrete slab & reinforcement		SF					
	Saw cut existing concrete slab to be removed		LF					
	Temporary shoring concrete slab - around opening		LF					
	Remove existing beam		LF					
	Temporary shoring concrete slab - below beam removed		LF					
	New pipe penetration for dunnage		EA					
	Remove roof membrane system		SF					
	Remove exhaust ductwork		LF					
	Remove existing fan, disconnect and remove all existing switches, wiring and conduit associated		EA					
	Remove existing condensing unit, disconnect and remove all existing switches, wiring and conduit associated		EA					
	Temporary shoring concrete slab - around opening		LF					
	Debris disposal		LS					
Miscellaneous demolition		SF						
	<b>subtotal</b>							
028213	<b>Asbestos Abatement</b>							
	- cellar		LS					
	- first floor		LS					
	- mezzanine		LS					
	- second floor		LS					

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**CONTRACTOR BID BREAKDOWN FORM**

PROJECT TITLE

NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION

FMS ID NUMBER

LNEMA08WS

PROJECT LOCATION

761 160th Street, Bronx, New York 10465

CLIENT AGENCY

NYPL

BIDDER:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	- third floor		LS					
	subtotal							
030000	DIVISION 3 - CONCRETE							
033000	<i>Cast-In-Place Concrete</i>							
	Repair concrete slab to receive new finish		SF					
	Refinish slab on grade - area of work (appx. 2,000 SF)		SF					
	@ ground floor		SF					
	@ second floor		SF					
	@ third floor		SF					
	@ roof level - repair concrete slab for pipe penetration		EA					
	Stair 1: finishes		LS					
	Concrete slab core drill @ first floor - electrical outlets		EA					
	Concrete slab repair around opening		LF					
	-basement @ elevator shaft		LF					
	- ground floor		LF					
	- second floor		LF					
	- third floor		LF					
	- roof level - new mechanical & elevator shaft.		LF					
033000	Concrete sidewall at ramp		SF					
	3 3/4" concrete fill (see decking in steel)		SF					
	@ ground floor		SF					
	@ second floor		SF					
	@ third floor		SF					
	@ roof level		SF					
	Infill shaft opening w/ new slab & metal deck		SF					
	@ second floor		SF					
	@ third floor		SF					

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	@ roof @ access door removed & others		SF					
	subtotal							
033300	<i>Architectural Cast in Place Concrete - included in 033000</i>							
035300	<i>Concrete Floor Topping</i> Premium raised slab on low slab : 3" min. L.W. concrete, concrete ribs, wwm reinf., high density extruded polysterene @ ground floor		SF					
	subtotal							
035416	<i>Cement Leveling Compound - included in 035300</i>							
040000	<b>DIVISION 4 - MASONRY</b>							
040100	<i>Masonry Restoration and Cleaning</i> Front façade & entrance Repair front façade due to door change		LS					
	Rear façade							
040100	Repair rear façade due to window change Clean existing bluestone window header New window sill to match existing header		LS LF LF					
	subtotal							
042000	<i>Unit Masonry</i> Interior CMU Type 8: 6" cmu @ cellar @ first floor @ second floor		SF SF SF					

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 PROJECT LOCATION: 761 160th Street, Bronx, New York 10465  
 BIDDER: LNEAMA08WS  
 FMS ID NUMBER: LNEAMA08WS  
 CLIENT AGENCY: NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	@ third floor		SF					
	subtotal							
051200	<b>DIVISION 5 - METALS</b> <b>Structural Steel</b>							
	Steel frame & connections							
	@ ground floor		LBS					
	@ mezzanine		LBS					
	@ second floor		LBS					
	@ third floor		LBS					
	@ roof level		LBS					
	Bearing beam pocket at existing wall, 1" thk. non-shrink grout @ steel frame							
	@ basement: existing steel beam to be resupported on new concrete wall w/ BP		EA					
	@ ground floor		EA					
	@ mezzanine		EA					
	@ second floor		EA					
	@ third floor		EA					
	@ roof level		EA					
	Elevator rail support HSS 8x6x1/4"							
	@ first, mezzanine, second & third floor		LF					
	HSS wall post - HSS 10x4x3/8" (32.58 #/lf) steel stair support anchors to wall							
	@ first floor		LF					
	@ second floor		LF					
	@ third floor		LF					
	Steel connection of new beam w/existing (cut concrete encasement and patch as required) @ ground floor							

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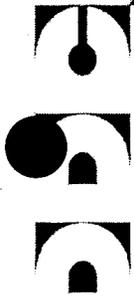
NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
051200	@ ground floor		EA					
	@ mezanine		EA					
	@ second floor		EA					
	@ roof level		EA					
	3/4" shear studs							
	@ ground floor		EA					
	@ mezanine		EA					
	@ second floor		EA					
	@ third floor		EA					
	Shelf angle 6 x 4 x 3/8" & anchor bolt bearing wall for floor support / existing beam to support new floor							
@ ground floor		LF						
@ second floor		LF						
@ third floor		LF						
Existing beam to be reinforced w/ welded steel WT: remove existing concrete encasement, applied fireproofing, concrete encasement								
@ second floor		LF						
@ third floor		LF						
Steel dunnage for mechanical equipment								
Steel frame & connections (galvanized steel)								
@ AHU-1			LBS					
@ AHU-2			LBS					
	subtotal							
053100	<b>Steel Decking</b>							
	2" thk. metal deck, 20 ga							
	@ ground floor		SF					
	@ second floor		SF					

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	@ third floor		SF					
	subtotal							
055000	<b>Miscellaneous Metals</b>							
	Exterior wall bracing		LS					
	10" x 4" x 3/8" thk. HSS (32.58 #/lf) steel stair support anchors to wall		SF					
	12" x 4" 5/8" thk. HSS tube stringer - intumescent painting		LF					
	10" x 4" 5/8" thk. HSS tube at landing - intumescent painting		LF					
	Miscellaneous steel & supports		LS					
	subtotal							
055800	<b>Perimeter Heating / Cooling enclosures</b>							
	Radiator cover		LF					
	subtotal							
055100	<b>Steel Pan Stairs</b>							
	Stair 1: Steel pan welded to stringer stair w/ concrete pan infill & cast iron nosing integral w/steel pan stair construction		LR					
	- basement thru first floor							
	Wall railings, stl railing		LF					
	Stair 1: Steel pan welded to stringer (continuous HSS section) stair w/ concrete pan infill & cast iron nosing integral w/steel pan stair construction							
	- first floor thru third floor		LR					
	subtotal							
057000	<b>Ornamental Metals - also included in 057010 &amp; 055100</b>							
	Metal display shelf at entry		LF					
	subtotal							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
057010	<b>Ornamental Glass Rail System</b>							
	Stairs railing							
	½" tempered w/ continuous steel handrail @ stairs		LF					
	Opening railings							
	42" high ½" thk. glass guardrail - lobby stairs & ramp @1st flr		LF					
	1½" SS handrail @ ramp @ second floor @ third floor		LF					
	<b>subtotal</b>							
057100	<b>Decorative Metal Stairs - included in 055100</b>							
062000	<b>DIVISION 6 - WOOD, PLASTICS AND COMPOSITES</b>							
	<b>Carpentry</b>							
	Miscellaneous wood blocking		LS					
	<b>subtotal</b>							
064023	<b>Architectural Woodwork</b>							
	First floor							
	17'-3 7/8" display shelf, bamboo finish @ lobby		LF					
	2'-6" x 15'-0" main circulation desk #1 : bamboo finish, interior shelf, (2)		LF					
	SS pad/graphic, leveling mount		EA					
	7'-4" ext. diam / 3'-0" int. diam , 28" ht donut computer table: 1/2" corian & plywood reveal black		LF					
2'-6" x 15'-0" circulation desk #2: bamboo finish, interior shelf, SS pad/graphic, leveling mount		LF						
3'-10" x 10'-0" self service station: bamboo finish, integrated display shelf w/1/4" glass cover, leveling mount.		LF						
	<b>Second floor</b>							

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BIDDER:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	30" wide work table: work counter white matt formica attached to wall w/steel angles @ staff room		LF					
	2'-6" x 4'-8" self-service station: bamboo finish, leveling mount		LF					
	2'-6" x 8'-6" self-service station: bamboo finish, interior shelf, door, SS pad/graphic, leveling mount		LF					
	7'-4" ext. diam / 3'-0" int. diam, 28" ht donut computer table: 1/2" corian glacier white & plywood reveal black		EA					
	Third floor							
	30" wide base cabinet and 4" thk. plam countertop @ staff lounge		LF					
	Misc. Millwork		SF					
	Vanity counter w/ lav openings @ bathrooms		LF					
	subtotal							
	<b>DIVISION 7 - THERMAL AND MOISTURE PROTECTION</b>							
071610	Capillary Waterproofing - included in other sections							
075500	Modified Bitumen Roofing							
	Patch w/ existing material around roof opening for mechanical and elevator shaft		LF					
	Miscellaneous repair existing roof system		SF					
	Roof Membrane (see Bid Booklet page 2a)		Roll					
	subtotal							
076200	Sheet Metal Work - included in 075500							
077100	Roof Specialties and Accessories - included in 075500							
078100	Sprayed Fire Resistive Material							
	Spray fireproofing: steel frame & M.D.		SF					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Ceiling							
	C3 - Underside of new floor infill - exposed fireproofing		SF					
	subtotal							
078413	<b>Firestops and Smoke seals</b>							
	Fire stopping		LS					
	subtotal							
079200	<b>Joint Sealers</b> - included in Division 9 - Finishes							
081113	<b>DIVISION 8 - OPENINGS</b>							
	<b>Steel Doors and Frames</b>							
	Basement							
	3' x 7' hm door / hm frame, hardware, ptd		EA					
	Ground floor							
	3' x 7' hm door / hm frame, hardware, ptd		EA					
	3'-8" x 7'-0" hm door / hm frame, hardware, ptd		EA					
	Second floor							
	3' x 7' hm door / hm frame, hardware, ptd		EA					
	Third floor							
	3' x 7' hm door / hm frame, hardware, ptd		EA					
	subtotal							
083113	<b>Access Doors</b>							
	2'-0" x 2'-0" 2hr rated access panels @ cellar hallway - clg.		EA					
	2'-0" x 2'-0" 2hr rated access panels @ third floor - clg - FSD		EA					
	2'-0" x 2'-0" 2hr rated access panels @ first floor - wall FSD		EA					
	2'-0" x 2'-0" 2hr rated access panels @ second floor - wall FSD		EA					
	2'-0" x 2'-0" 2hr rated access panels @ first floor - slab - FSD		EA					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	2'-0" x 2'-0" 2hr rated access panels @ second floor - slab FSD		EA					
	subtotal							
084228	<b>All Glass Doors and Partitions</b>							
	Interior glass partition @ vestibule		SF					
	5'-6" high, ½" thk glass partition @ ground floor		LF					
	3'-0" x 5'-6" powdercoated aluminum gate @ ground floor		EA					
	subtotal							
085200	<b>Exterior Wood Windows and Doors</b>							
	Front façade							
	Clean existing windows - second & third floors		SF					
	Clean existing storefront - ground floor		SF					
	Rear façade							
	New exterior window: IGU -1/4" low E inboard- 1/4" lam. outboard & ptd		SF					
	HD wood frame, sealed & caulking @ ground level							
	Clean existing storefront - cellar		SF					
	Clean existing windows - second & third floors		SF					
	Exterior Doors							
	2 - 3'-1" x 9'-0" glazed ptd mahogany doors @ main entrance		PR					
	Signage pouch mounted to inside surface of glass		EA					
	6' x 8' insulated glass panel /metal frame, double - vestibule		PR					
	Clean existing door header & signage - protect from damage -		LF					
	Install new granite threshold		EA					
	subtotal							
087100	<b>Finish Hardware</b>							
	1" diam. Aluminum push / pull handles		EA					
	subtotal							

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088000	<i>Glass and Glazing</i> - included in 084228 & 085200							
089000	<i>Louvers and Vents:</i> The louvers are detail with Plumbing and HVAC sections							
090120	<b>DIVISION 9 - FINISHES</b> <i>Plaster Restoration</i> Ceiling C1 - Patch & repair existing plaster ceiling as required, paint sprayed. Miscellaneous ceiling at existing areas Molding at ceiling, paint Relocation of HW piping above ceiling at first floor windows Patch existing ceiling, paint Plaster molding at ceiling, paint		SF LS LF  LF LF					
	<b>subtotal</b>							
092713	<b>Glass-Fiber-Reinforced Gypsum Fabrications</b> New round column enclosure. Match adjacent columns finish, base, capitals, etc. @first floor 2'-6" x 2'-6" GFRG: glass fiber reinforced gypsum ceiling access panel @ toilet rooms		EA EA					
	<b>subtotal</b>							
092900	<b>Gypsum Drywall</b> Cellar Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides. Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side. Type 4: 3-5/8" mtl studs, two layer 5/8" gwb type X both sides - 2 hr. Furring: mtl stud, 5/8" gwb @ cmu walls Miscellaneous repair partition at existing		SF SF SF SF LS					

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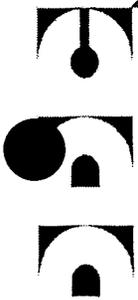
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092900	Ceiling								
	C2 - 5/8" gwb ceiling		SF						
	Ground floor								
	Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides.		SF						
	Type 1A: 3-5/8" mtl studs, one layer 5/8" gwb both sides, continuous batt insulation		SF						
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side.		SF						
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side - soffit		LF						
	Type 4: 3-5/8" mtl studs, two layer 5/8" gwb type X both sides - 2 hr.		SF						
	Furring: mtl stud, 5/8" gwb @ cmu walls		SF						
	Column furring: refurbish existing		EA						
	Miscellaneous repair partition at existing		LS						
	Second floor								
	Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides.		SF						
	Type 1A: 3-5/8" mtl studs, one layer 5/8" gwb both sides, continuous batt insulation		SF						
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side.		SF						
	Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side - soffit		LF						
Type 4: 3-5/8" mtl studs, two layer 5/8" gwb type X both sides - 2 hr.		SF							
Furring: mtl stud, 5/8" gwb @ cmu walls		SF							
Column furring: refurbish existing		EA							
Miscellaneous repair partition at existing		LS							
Third floor									
Type 1: 3-5/8" mtl studs, one layer 5/8" gwb both sides.		SF							
Type 1A: 3-5/8" mtl studs, one layer 5/8" gwb both sides, continuous batt insulation		SF							
Type 2: 3-5/8" mtl studs, one layer 5/8" gwb one side.		SF							
Type 4: 3-5/8" mtl studs, two layer 5/8" gwb type X both sides - 2 hr.		SF							

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092900	Furring: mtl stud, 5/8" gwb @ cmu walls		SF					
	Miscellaneous repair partition at existing		LS					
	Protection		LS					
	<b>subtotal</b>							
093013	<b>Ceramic Tiling</b>							
	Ceramic tile - wall		SF					
	Ceramic tile - floor		SF					
	Ceramic tile cove base		LF					
	<b>subtotal</b>							
096400	<b>Wood Strip Flooring</b>							
	Wood flooring, white oak planks		SF					
	Miscellaneous flooring at existing areas		LS					
	<b>subtotal</b>							
096519	<b>Resilient Tile Flooring</b>							
	Rubber Flooring - 24' x 24"		SF					
	Rubber Flooring - 24' x 24" - Round Accent - premium		SF					
	<b>subtotal</b>							
096813	<b>Carpet Tile</b>							
	Carpet		SF					
	<b>subtotal</b>							
096816	<b>Carpet (Glue Down)</b>							
	Carpet		SF					
	<b>subtotal</b>							

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097200	<i>Wall covering</i> Digitally printed custom wallpaper @ first floor @ second floor  subtotal		SF SF					
099000	<i>Painting &amp; Finishing</i> Ptd wall Ptd existing & new ceiling Miscellaneous ptd existing rooms Paint existing guardrail - exterior Repaint existing doors @ cellar @ ground level - exterior (north elev.) @ second floor - janitor's @ third floor Repaint exterior windows @ Front façade - second & third floors - ground floor Rear façade New exterior window including ptd, sealed & caulking @ ground level - cellar - second & third floors Seal concrete Existing floor to remain  subtotal		SF SF LS LF EA EA EA EA SF SF SF SF SF SF					
099646	<i>Intumescent Painting - In 05500</i>							

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101400	<b>DIVISION 10 - SPECIALTIES</b> <i>Identifying Devices</i> Misc. specialties Fixed Tackboards Homasote tack board: 3/4" MDF or plywood, 1/4" forbo tack board, 1" x 1/4" ptd wood trim, 1/8" & 1/16" reveal - 7'0" x 7'0" @ first floor - 6'9" x 5'6" @ second floor Interior signage Basement Ground floor Second floor Third floor Front entrance New 1'-0" x 1'-9" bronze plaque New tamper resistant sign location for public hours 54" x 96" public notices board, MDF/FORBO w/wood trim @ lobby 101 1'-1" x 4'-5" brochure beam: 1/8" steel plate bolted to wood floor, 1/8" bent steel beam @ vestibule <b>subtotal</b>		SF EA EA SF SF SF SF EA EA EA LF					
102114	<i>Toilet Partitions</i> Toilet partition - Stainless Steel @ first floor Urinal partition - first floor <b>subtotal</b>		EA EA					
102213	<i>Wire Mesh Partitions</i> Wire Mesh Partitions <b>subtotal</b>		LF					

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	Wire Mesh Partition swing door		EA					
	subtotal							
102813	<i>Toilet Accessories</i>							
	Grab bar - 36"		EA					
	Grab bar - 42"		EA					
	Toilet paper dispenser - by owner		EA					
	Soap dispenser - by owner		EA					
	Paper towel dispenser / waste receptacle		EA					
	Hand dryer, SS, wall mounted		EA					
	Mirror, SS frame		SF					
	Mop rack @ janitor		EA					
	Robe hook		EA					
	Baby changing station, SS, wall mounted		EA					
	Trash cans		EA					
	subtotal							
104416	<i>Fire Extinguisher &amp; Cabinets</i>							
	Fire extinguisher & cabinets		EA					
	subtotal							
113100	<i>DIVISION 11 - EQUIPMENT Appliances</i>							
	Staff pantry							
	Full height refrigerator		EA					
	Microwave		EA					
	subtotal							

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**CONTRACTOR BID BREAKDOWN FORM**

FMS ID NUMBER LNEMA08WS  
CLIENT AGENCY NYPL

PROJECT TITLE  
NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION

PROJECT LOCATION  
761 160th Street, Bronx, New York 10465

BIDDER:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
120000	<b>DIVISION 12 - FURNISHINGS</b>							
122413	<i>Window Shades</i> - front façade - rear façade		SF SF					
	subtotal							
124813	<b>Floor Mats and Frames</b> First floor Metal grating walk-off matt - entrance Second floor 12" w x 96" ht aluminum EZ-shelving (5 shelves)		SF LF					
	subtotal							
142423	<b>DIVISION 14 - CONVEYING SYSTEM</b> <i>Hydraulic Passenger Elevator</i> Passenger Elev. 3,500 lbs, 4 stops ( front doors) Cabin upgrade		EA EA					
	subtotal							
210500	<b>DIVISION 21 - FIRE SUPPRESSION</b> <i>Common Work Results for Fire Suppression - included in 211300</i>							
211313	<i>Wet-Pipe Sprinkler Systems</i> Sprinkler heads @ cellar		EA					
211313	Piping: 4" galvanized steel piping, Sch 40, incoming service - F 4" F - connection w/ existing incoming service 4" black steel piping, Sch 40, SP		LF EA LF					

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	2½" black steel piping, Sch 40		LF					
	2" black steel piping, Sch 40		LF					
	1½" black steel piping, Sch 40		LF					
	1¼" black steel piping, Sch 40		LF					
	1" black steel piping, Sch 40		LF					
	2" / 1" drain galvanized steel piping, Sch 40		LS					
	4" capped outlet		EA					
	4" DCVA single		EA					
	4" OS & Y valve		EA					
	4" alarm check valve assembly		EA					
	4" floor control assembly w/2½" butterfly valve, flow switch & 1" drain assembly w/inspector test valve		EA					
	4" check valve, ABD		EA					
	Tamper Switch		EA					
	Inspector's test connection		EA					
	Hangers & seismic bracing		LS					
	Fire Department Connection		EA					
	Miscellaneous fire protection		SF					
	Allow for Testing		LS					
	Allow for supervision		LS					
	<b>subtotal</b>							
220000	<b>DIVISION 22 - PLUMBING</b>							
220500	<i>Common Work Results for Plumbing</i>							
220516	<i>Expansion Fitting and Loops for Plumbing Piping - included in other sections</i>							
220519	<i>Meter and Gauges for Plumbing Piping - included in other sections</i>							
220523	<i>General-Duty Valves for Plumbing Piping - included in other sections</i>							
220529	<i>Hangers and Supports for Plumbing Piping and Equipment - included in 221316, 221113 and other sections.</i>							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
220548	<i>Vibration and Seismic Controls for Plumbing Piping and Equipment</i> - included in 221316, 221113 and other sections.							
220553	<i>Identification for Plumbing Piping and Equipment</i> - included in 221316, 221113 and other sections.							
220700	<b>Plumbing Insulation</b>							
	Insulation ( CW & HW)							
	Water Piping, 1 1/2"	221	LF	1.51	334.57	7.70	1,703	2,038
	Water Piping, 1 1/4"	50	LF	1.40	70.34	7.70	387	457
	Water Piping, 1"	182	LF	1.30	236.47	7.70	1,401	1,637
	Water Piping, 3/4"	556	LF	1.21	673.91	7.10	3,946	4,620
	Water Piping, 1/2"	83	LF	1.11	92.56	6.78	564	657
	subtotal							
221113	<b>Facility Water Distribution Piping</b> - Included in 221116							
221116	<b>Domestic Water Piping</b>							
	CW							
	Water Piping, 2"		LF					
	Water Piping, 1 1/2"		LF					
	Water Piping, 1 1/4"		LF					
	Water Piping, 1"		LF					
	Water Piping, 3/4"		LF					
	Water Piping, 1/2"		LF					
221116	Water Pipe Fittings		LS					
	Valve, 2"		EA					
	Valve, 1 1/2" and 1 1/4"		EA					
	Valve, 3/4"		EA					
	Valve, 1/2"		EA					
	Connect to Existing		EA					
	Connect to Existing (Main)		EA					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
HW	Hot Water Piping, 1"		LF					
	Hot Water Piping, 3/4"		LF					
	Hot Water Piping, 1/2"		LF					
	Valve, 1 "		EA					
	Valve, 3/4"		EA					
	Connect to Existing		EA					
	subtotal							
221119	<b>Domestic Water Piping Specialties</b>							
	SA - 3/4" shock absorber		EA					
	Miscellaneous access door for isolation valve		LS					
	Domestic water meter		EA					
	2" DCVA		EA					
	2" OS & Y valve		EA					
	subtotal							
221316	<b>Sanitary Waste and Vent Piping</b>							
	DWV Piping							
	DWV Piping above grade, 6"		LF					
	DWV Piping above grade, 4"		LF					
	DWV Piping above grade, 3"		LF					
	DWV Piping above grade, 2" & 1 1/2"		LF					
	DWV Pipe fittings		LS					
	DWV Pipe fittings, 3" - T, TY		EA					
	DWV Pipe fittings, 2" & 1 1/2" - T, TY		EA					
	DWV Pipe fittings, 2" & 1 1/2" - 90		EA					
	Fresh Air Inlet		EA					

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Cleanout - 4" S		EA					
	Cleanout - 3" S		EA					
	Cleanout - 2½" S		EA					
	Floor Drain, 3"		EA					
	Floor Drain, 3" @ toilet- second floor		EA					
	Vent Through Roof, 4"		EA					
	Cap, 6"		EA					
	Trap Primer		EA					
	Connect to Existing (Main)		EA					
	Vent							
	DWV Piping above grade, 4"		LF					
	DWV Piping above grade, 2" & 1 1/2"		LF					
	Connect to Existing (Main)		EA					
	Allow discharge sump pump piping		LS					
	subtotal							
221319	Sanitary Waste Piping Specialties - included in 221316							
221429	Sump Pumps							
	Elevator sump pump		EA					
	subtotal							
223400	Plumbing Equipment							
	Expansion Tank, 8 gallon		EA					
	Hot Water recirculation pump, 1/8 hp with aqua stat.		EA					
	subtotal							
224000	Plumbing Fixtures (Including Rough in)							

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	Water Closets w/ flushometer		EA					
	Lavatories, wall Hung		EA					
	Urinals w/flushometer, wall mounted		EA					
	Janitor Sink		EA					
	Pantry sink, SS		EA					
	Pantry sink, SS - to be reinstalled (3rd floor)		EA					
	subtotal							
224700	<b>Drinking Fountains and Water Coolers</b>							
	Water fountain, wall hung		EA					
	Bottle filling station - 1st floor		EA					
	Bottle filling station - 2nd floor		EA					
	subtotal							
230000	<b>DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING</b>							
230110	<i>Basic Mechanical &amp; Methods</i> - included in other sections							
230120	<i>Seismic</i> - included in other sections							
230500	<b>Common Work Results for HVAC</b>							
	<i>Misc, HVAC</i>							
	Temporary Heat		LS					
	Sleeve through wall & slab		LS					
	Rigging of HVAC Equipment		LS					
	Fire stopped and sealed where required		LS					
	Pitch pocket & flashing for gas riser at roof		EA					
	Pitch pocket & flashing for downspout		EA					
	Pitch pocket at ductwork support & base plate		EA					
	subtotal							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
230513	<i>Common Motor Requirements for HVAC Equipment Motors - included in other sections</i>							
230523	<i>General-Duty Valves for HVAC Piping - included in other sections</i>							
230529	<i>Hangers &amp; Supports for HVAC Piping and Equipment - included in other sections</i>							
230548	<i>Vibration and Seismic Controls for HVAC Piping and Equipment - included in other sections</i>							
230553	<i>Identification for HVAC Piping and Equipment - included in other sections</i>							
230593	<i>Testing, Adjusting, Balancing for HVAC</i>							
	Testing and Balancing		LS					
	<b>subtotal</b>							
230700	<i>HVAC Insulation</i>							
	Insulation ( CW & HW)							
	Water Piping, 1"		LF					
	Water Piping, 3/4"		LF					
	Relocation of HW piping above ceiling at first floor windows							
	Insulation ( CW & HW)							
	Water Piping, 1"		LF					
	Water Piping, 3/4"		LF					
	Duct Insulation		SF					
	Exterior Duct Insulation & support		SF					
	2" Exterior rigid foam board insulation		SF					
	2hr Duct Wrap		SF					
	<b>subtotal</b>							
230900	<i>Automatic Temperature Control and Sequence of Operations</i>							
	Thermostats and wiring		EA					
	CO2 and wiring		EA					
	Webstat Thermostat (Honeywell T7350H1009) Material only ( <i>see Bid Booklet page 2b</i> )		EA					

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	Web Stat Controller (Honeywell W7350A1000) Material Only (see Bid Booklet page 2b)		EA					
	Controls		LS					
	subtotal							
2300993	Sequence of Operations - Included in 230900							
231123	Facility Natural Gas Piping							
	Gas Piping, 2½"		LF					
	Gas Piping, 3/4"		LF					
	Gas Pipe Fittings		EA					
	Gas plug, 2½"		EA					
	Gas plug, 3/4"		EA					
	2½" gas riser in WP pitch pocket @ roof		EA					
	Gas cap, 2½"		EA					
	Gas cap, 3/4"		EA					
	Connection to existing pipe, 2½"		EA					
	Connection to Equipment		EA					
	HVAC Piping							
	Refrigeration Piping		LF					
	Charging refrigerant		LS					
	Hot Water Piping							
	Disconnect HW Convectors		EA					
	Hot Water Pipe, 1"		LF					
	Hot Water Pipe, 3/4"		LF					
	Valve, 1"		EA					
	Valve, 3/4"		EA					
	Relocation of HW piping above ceiling at first floor windows							
	Disconnect HW Convectors		EA					

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	Hot Water Pipe, 1"		LF					
	Hot Water Pipe, 3/4"		LF					
	1" 90 elbow		EA					
	1" x 3/4" T		EA					
	3/4" elbow		EA					
	Hot Water Pipe Fittings		LS					
	Connection to existing convector including valve		EA					
	Connection to Existing piping		EA					
	Hot Water Pipe Fittings		LS					
	Connection to Existing piping		EA					
	Connections to equipment							
	HV Unit		EA					
	CUH-1		EA					
	Radiator		EA					
	Mini Split System, refrigerant		EA					
	Radiator Control Valve		EA					
	<b>subtotal</b>							
232123	<b>Hydronic Pumps</b>							
	Condensate pumps 1/3		EA					
	<b>subtotal</b>							
233113	<b>Metal Ducts</b>							
	Supply / Return Ductwork		Lbs					
	Supply Ductwork - round		Lbs					
	Supply, Exhaust, OSA and Return Duct		Lbs					
	Flexible Connection		LF					
	Ductwork connection w/existing		EA					

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	Provide gooseneck 10 x 6		EA					
	subtotal							
<b>233300</b>	<b>Air Duct Accessories</b>							
	Hood for power exhaust discharge		EA					
	FSD less than 2 SF		EA					
	FSD 2 SF to 3 SF		EA					
	FSD 3 SF to 4 SF		EA					
	FSD 4 SF to 5 SF		EA					
	Duct accessories		LS					
	Provide barometric relief damper at gooseneck		EA					
	Motorized damper at elevator smoke shaft		EA					
	subtotal							
<b>233423</b>	<b>HVAC Power Ventilators</b>							
	Power Exhauster for RTU-1 and RTU-2		EA					
	Basement Extract Fan - EF-B-1, 290 cfm - inline fan		EA					
	Exhaust fan, EF-B-2, 225 cfm, inline		EA					
	Toilet Exhaust fan, EF-R-1, 600 cfm, with roof curb		EA					
	subtotal							
<b>233713</b>	<b>Diffusers, Registers and Grills</b>							
	Drum Louver DL-2 - 24 x 8		EA					
	Drum Louver DL-1 - 30 x 8		EA					
	Supply Diffuser SD-1, 14 x 8		EA					
	Supply Diffuser SD-1, 26 x 8		EA					
	Supply Diffuser CD-1, 24" diam.		EA					
	Return Grill SG-1 - 10 x 6		EA					

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	Transfer Register TR-1 - 22 x 8		EA					
	Return Register RR1, 8 x 8		EA					
	Return Register RR2, 14 x 14		EA					
	Return Grill RG-1 - 6 x 6		EA					
	Return Grill EG-1/2 - 8 x 8		EA					
	Return Grill RG-1 - 24 x 6		EA					
	Return Grill 6' x 3'		EA					
	Return Grill 14' x 2'		EA					
	Transfer Grill TG-1 - 6 x 6		EA					
	Door Louver L - 12 x 6 @ first floor ( M & W bathrooms)		EA					
	Exterior Louver within existing window frame - 12 x 6 @ cellar (recycling room)		EA					
	Intake Louver 12 x 12		EA					
	Intake Louver 26 x 12		EA					
	WWS and frame		SF					
	Connect to existing Louver		EA					
	Volume damper		SF					
	Elevator shaft vent & 1/2" of area barometric relief damper		SF					
	Motorized damper (2/3 of area)		SF					
	<b>subtotal</b>							
<b>237413</b>	<b>Packages, Outdoor, Central Station Air Handling Units</b>							
	VAV Roof top packaged Air Cooled Air Conditioner, with DX cooling, Coil Gas Heat, 5,330 supply fan VFD, 17.5 ton cooling - RTU-1		EA					
	VAV Roof top packaged Air Cooled Air Conditioner, with DX cooling, Coil Gas Heat, 5,840 supply fan VFD, 20 ton cooling - RTU-2		EA					
	HV Unit, 500 CFM, 46.12 MBUH, Hot Water Coil		EA					
	<b>subtotal</b>							

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CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
238219	<i>Fan Coil Units</i>							
	Mini Split System ACU / ACCU 1/3 - 1.5 ton		EA					
	Fin Tube Radiation							
	Fin Tube Radition - FTR-1 - Covers by Architecture		LF					
	Fin Tube Radition - FTR-2 - Covers by Architecture		LF					
	Fin Tube Radition -Relocated - cellar		EA					
238239	Fin Tube Radition -Relocated - second floor		EA					
	Convector -Relocated - third floor		EA					
	<b>subtotal</b>							
260500	<i>Unit Heaters</i>							
	Cabinet Unit Heater CUH-1, 310 cfm, 22.5 MBH		EA					
	<b>subtotal</b>							
	<b>DIVISION 26 - ELECTRICAL</b>							
260500	<i>Common Work Results for Electrical</i>							
	Sleeve through wall & slab		LS					
	Fire stopped and sealed where required		LS					
260519	2½" emt sleeves + 25 pair cable at cellar		LF					
	<b>subtotal</b>							
	<i>Low-Voltage Electrical Power Conductors and Cables</i>							
	Service & Distribution							
260519	Electric Feed - Elevator, 1½C, 3#1/0 + 1#6G		LF					
	Electric Feed - condenser, fan, HV,		LF					
	Electric Feed - AC, CU, EF-RTU		LF					
	Electric Feed - RTU		LF					
	Electric Feed - MDP, (2)4W 500 KCMIL + (1)#10G		LF					
Electric Feed - Panels PLP-C, PLP-1, PLP-2, PLP-3		LF						

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	Electric Feed - Panels MP-C, 2½"C, 3#4/0 + 1#4/0N + 1#4G		LF					
	Equipment -3#500 + 1#500G - 3½" c		LF					
	Lighting conduit & wiring		LF					
	Branch conduit & wiring, 3/4" EMT with 4#12		LF					
	Time switch management		EA					
	Rewire circuits at basement		LS					
	Rewire circuits at third floor		LS					
	subtotal							
260526	Grounding and Bonding for Electrical Systems		LS					
	Grounding & testing							
	subtotal							
260529	Hangers and Supports for Electrical System - included in other sections							
260533	Raceways and Boxes for Electrical Systems - included in other sections							
260548	Vibration and Seismic Controls for Electrical System - included in other sections							
260553	Identification for Electrical System - included in other sections							
260573	Overcurrent Protective Device Coordination Study - included in other sections							
262413	Switchboards							
	Meter Pan, Meter CT cabinet and end Box		EA					
	subtotal							
262416	Panelboards							
	Main Distribution Panel fused disconnect, 800 amp		EA					
	Main Distribution Panel, MPD, 800 amp, 120/208		EA					
	Mechanical Power Panel, MPR, 400 amp, 120/208V, 3ph, 4w		EA					
	Electrical Panel, MP-C, 225A, 120/208v, 3ph, 4w.		EA					

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	Electrical Panel, PLP-C, PLP-1, PLP-2, PLP-3, 100A, 120/208v, 3ph, 4w.		EA					
	Lighting relay panel		EA					
	Surge Suppressor		EA					
	<b>subtotal</b>							
262726	<b>Wiring Devices</b>							
	Toggle switch - fused, CUH, EF, HV-1, P1, UH-1		EA					
	Switches - single pole		EA					
	Switches - dimmer switch		EA					
	Switches - St - digital time wall switch		EA					
	Switches - PC - ceiling mounted day light sensor		EA					
	Switches - OC 1 - ceiling mounted occupancy sensor		EA					
	Switches - OC 2 - dual tech ceiling mounted occupancy sensor		EA					
	Switches - OC 3 - wall mounted occupancy sensor		EA					
	Switches - OC 4 - wall mounted occupancy sensor throw optics		EA					
	Duplex Receptacles		EA					
	Duplex Receptacles - WP @ roof		EA					
	GFCI Receptacles		EA					
	Quad Receptacles		EA					
	Quad Receptacles - GFI		EA					
	Quad Receptacles - floor mounted - 2 power		EA					
	Quad Receptacles - floor mounted - 2 power + 2 data		EA					
	Quad Receptacles - floor mounted - 4 power		EA					
	Quad Receptacles - floor mounted - 4 power + 2 data		EA					
	Quad Receptacles - clg mounted - cellar		EA					
	Cable tray		LS					
	J-Box		LS					

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NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

**CONTRACTOR BID BREAKDOWN FORM**

PROJECT TITLE  
PROJECT LOCATION  
BIDDER:

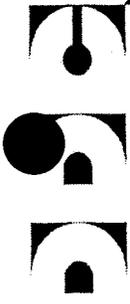
NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	Pull box		LS					
	Channeling of floor slab for conduits		If					
	subtotal							
262813	Fuses- Included in other sections							
262816	Enclosed Switches and Circuit Breakers							
	Disconnect, Elevator		EA					
	Disconnect switch- fused, AC, CU, EF-RTU		EA					
	Disconnect switch- fused, EF-RTU, WP		EA					
	Disconnect switch- RTU, WP		EA					
	Time switch management		EA					
	subtotal							
265000	Architectural Lighting Fixture Specifications							
	Light fixture @ Cellar							
	Type C1: 4'-0"   x 6" strip light fixture, pendant mounted, fluorescent.		EA					
	Type C1: 4'-0"   x 6" strip light fixture, pendant mounted, fluorescent - EMERG.		EA					
	Type C2: 4'-0"   x 6" strip light fixture, wall mounted, fluorescent.		EA					
	Type C2: 4'-0"   x 6" strip light fixture, wall mounted, fluorescent - EMERG.		EA					
	Type C3: 4'-0"   x 6" strip light fixture, surface mounted, fluorescent.		EA					
	Type C3: 4'-0"   x 6" strip light fixture, surface mounted, fluorescent - EMERG.		EA					
	Type elevator pit light - jelly jar		EA					
	Exit light (LED)		EA					
	Light fixture @ 1st floor							

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NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY  
LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
265000	Type A1: 8'-0"   x 6" strip light fixture T-8, surface mounted, fluorescent.		EA					
	Type A1: 8'-0"   x 6" strip light fixture T-8, surface mounted, fluorescent - EMERG		EA					
	Type C: 6" downlight - EMERG, recessed		EA					
	Type C1: 4'-0"   x 6" strip light fixture, pendant mounted, fluorescent.		EA					
	Type C2: 4'-0"   x 6" strip light fixture, wall mounted, fluorescent.		EA					
	Type C2: 4'-0"   x 6" strip light fixture, wall mounted, fluorescent - EMERG.		EA					
	Type C5: 4'-0"   x 6" direct industrial, wall mounted, fluorescent.		EA					
	Type C5: 4'-0"   x 6" strip light fixture, wall mounted, fluorescent - EMERG.		EA					
	Type C7: 5'-0"   x 6" strip light fixture, pendant mounted, fluorescent.		EA					
	Type C7: 5'-0"   x 6" strip light fixture, pendant mounted, fluorescent - EMERG.		EA					
	Type D: 2'-0"   x 6" strip light fixture, wall mounted, fluorescent.		EA					
	Type W: blue warning light - see security		EA					
	Exit light (LED)		EA					
	Light fixture @ 2nd floor							
	Type A1: 8'-0"   x 6" strip light fixture T-8, surface mounted, fluorescent.		EA					
	Type A1: 8'-0"   x 6" strip light fixture T-8, surface mounted, fluorescent - EMERG		EA					
	Type C: 6" downlight - EMERG, recessed		EA					
	Type C1: 4'-0"   x 6" strip light fixture, pendant mounted, fluorescent.		EA					
	Type C1: 4'-0"   x 6" strip light fixture, pendant mounted, fluorescent - EMERG.		EA					
	Type C4: 4'-0"   x 6" direct industrial, clg. mounted, fluorescent.		EA					
	Type C4: 4'-0"   x 6" direct industrial, clg. mounted, fluorescent - EMERG.		EA					
	Type B1: 48" $\Phi$ light fixture @ lobby		EA					
	Type B2: 30" $\Phi$ light fixture @ lobby		EA					

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NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

BIDDER:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
265000	Exit light (LED)		EA					
	Light fixture @ 3rd floor							
	Type C1: 4'-0"   x 6" strip light fixture, pendant mounted, fluorescent.		EA					
	Type C1: 4'-0"   x 6" strip light fixture, pendant mounted, fluorescent - EMERG.		EA					
	Type C5: 4'-0"   x 6" direct industrial, wall mounted, fluorescent.		EA					
	Type C6: 4'-0"   x 6" direct industrial, pendant mounted, fluorescent.		EA					
	Type C6: 4'-0"   x 6" direct industrial, pendant mounted, fluorescent - EMERG.		EA					
	Type C7: 5'-0"   x 6" strip light fixture, pendant mounted, fluorescent.		EA					
	Type C7: 5'-0"   x 6" strip light fixture, pendant mounted, fluorescent - EMERG.		EA					
	Exit light (LED)		EA					
	Stair lighting - EMERG.		EA					
	<b>subtotal</b>							
270000	<b>DIVISION 27 - COMMUNICATIONS</b>							
270526	<b>Communications Grounding and Bonding</b>							
	Telecom grounding busbar		EA					
	<b>subtotal</b>							
270528	<b>Communications Pathways</b>							
	18" x 34" access panel (1st, 2nd & 3rd floor)		EA					
	12" cable tray		LF					
	12" vertical cable tray @ communication riser		LF					
	4' x 8' x 3/4" fire-rated plywood		SF					
	Voice, data patch panel & rack		EA					
	Telecom 48 port patch panel, backbone & equipment rack		EA					
	Voice, backbone / riser termination blockdata patch panel & rack		EA					
	1D Data outlets (floor box)		EA					

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761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	3D - Data outlets (floor box)		EA					
	Tel/Data outlets - 1V/2D outlet		EA					
	Analog voice outlet - 1A-D		EA					
	TV outlet		EA					
	Telephone outlet		EA					
	Tel/Data outlets		EA					
	Tel/Data outlets above ceiling		EA					
	WAP - 2 port wireless access point		EA					
	WLAN - Data signal - receptor		EA					
	Tel/Data 1" empty conduit		LF					
	1" emt + grounding conductor		LF					
	4" sleeve to corridor for cables running		EA					
	2" conduit sleeve to exterior wall for station cables		EA					
	4" conduit sleeve thru concrete slab		EA					
	Miscellaneous technology		LS					
	<b>subtotal</b>							
<b>271000</b>	<b>Communications Cabling</b>							
	Allow for Cat 6 Cabling		If					
	<b>subtotal</b>							
<b>280000</b>	<b>DIVISION 28 - ELECTRONIC SAFETY AND SECURITY</b>							
<b>281000</b>	<b>Security System</b>							
	Security rack: I-Star (hook ups to LAN), 17" monitor, DVR, USB control module, UTP receiver HUB.		LS					
	IT rack 1 & 2		LS					
	Battery backup		EA					
	SDF - security distribution frame: security device, lock power supply, cctv power supply, etc.		EA					
	4' x 8' x 3/4" firerated plywood		SF					

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NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	New 8" x 8" x 96" trough for security cables		Ea					
	New 6" x 6" x 24" trough for security cables		Ea					
	Motion sensor - wall mounted		EA					
	Motion sensor - clg. Mounted		EA					
	Door contact		LS					
	Distress button		LS					
	Security camera:							
	- wall mounted		EA					
	- wall mounted - PAN / tilt camera		EA					
	- ceiling mounted		EA					
	- pedestal mounted		EA					
	C / ELR / PT: card reader - Tyco RM2L-PH (see Bid Booklet page 2e)		EA					
	C / ELR / PT: card reader - Install plus delivery, overhead, tax		EA					
	IDS - intrusion detection system keypad		EA					
	USB Control Module - American Dynamics ADACSNET (see Bid Booklet page 2e)		EA					
	USB Control Module - Install plus delivery, overhead, tax		EA					
	Control Relay		EA					
	Maglock at shoe (failsafe and hook up to fire alarm) @ main entrance		EA					
	Type W: blue warning light @ vestibule		EA					
	Security conduit & wiring		LF					
	Integrator		LS					
	1" conduit sleeve thru concrete slab and core drill for entry vestibule		EA					
	3/4" conduit sleeve thru concrete slab and core drill for duress button		EA					
	Security		SF					

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NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

**CONTRACTOR BID BREAKDOWN FORM**

FMS ID NUMBER LNEMA08WS  
CLIENT AGENCY NYPL

PROJECT TITLE NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
PROJECT LOCATION 761 160th Street, Bronx, New York 10465

BIDDER:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
281000	Access Controller - Tyco STAR016-2URM - (see Bid Booklet page 2e)		EA					
	HID Reader - (see Bid Booklet page 2e)		EA					
	Digital Video Management System - American Dynamics ADD6R0D0DV100 - (see Bid Booklet page 2F)		EA					
	LCD Monitor Belkin F1DC101P-DR (see Bid Booklet page 2F)		EA					
	Passive UTP Tranceiver Hub - Altronix Hubway 16CD - (see Bid Booklet page 2F)		Ea					
	subtotal							
283111	<b>Digital Addressable Fire-Alarm System</b>							
	Fire Alarm Control Panel (GESecurity EST3) (see Bid Booklet page 2e)		EA					
	Fire Alarm Control Panel - Install plus delivery, overhead, tax		EA					
	Annunciator panel (GE Security EST3) (see Bid Booklet page 2e)		EA					
	Annunciator panel - Install plus delivery, overhead, tax		EA					
	Fused disconnect switch, 30 amp		EA					
	Smoke Detector (GE Security EST3: SIGA2-PS) - Material Only (see Bid Booklet page 2b)		EA					
	Smoke Detector - Install plus delivery, overhead, tax Only		EA					
	Smoke Detector - elevator overrun - (GE Security EST3: SIGA2-PS) - Material Only (see Bid Booklet page 2c)		EA					
	Smoke Detector - elevator overrun - Install plus delivery, overhead, tax Only		EA					
	Heat Detector (GE Security EST3: SIGA2-HRS) - Material Only (see Bid Booklet page 2b)		EA					
	Heat Detector - Install plus delivery, overhead, tax Only		EA					
	Water Flow Switch (GE Security EST3: SIGA2-CT1) - Material Only (see Bid Booklet page 2c)		EA					
	Water Flow Switch - Install plus delivery, overhead, tax		EA					
	Tamper Switch (GE Security EST3: SIGA2-CT1) - Material Only (see Bid Booklet page 2c)		EA					
	Tamper Switch - Install plus delivery, overhead, tax only		EA					

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NEW YORK CITY DEPARTMENT OF  
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**CONTRACTOR BID BREAKDOWN FORM**

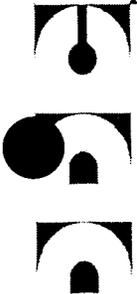
FMS ID NUMBER LNEMA08WS  
CLIENT AGENCY NYPL

PROJECT TITLE NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
PROJECT LOCATION 761 160th Street, Bronx, New York 10465

BIDDER:

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
283111	End of Line Device		EA					
	Manual Pull Station (GE Security EST3: SIGA-270) - Material Only (see Bid Booklet page 2b)		EA					
	Manual Pull Station - Install plus delivery, overhead, tax only		EA					
	Manual Pull Station - WP (GE Security EST3: SIGA-270) - Material Only (see Bid Booklet page 2b)		EA					
	Duct Detector (GE Security EST3: SIGA-SD) - Material Only (see Bid Booklet page 2c)		EA					
	Duct Detector - Install plus delivery, overhead, tax only		EA					
	Control Down Relay (GE Security EST3: SIGA-CR) - Material Only (see Bid Booklet page 2d)		EA					
	Control Down Relay - Install plus delivery, overhead, tax only		EA					
	Remote Indicator Light (GE Security EST3: SIGA-SD) - Material Only (see Bid Booklet page 2c)		EA					
	Remote Indicator Light - Install plus delivery, overhead, tax only		EA					
	Horn / Strobe (GE Security EST3: GIRF-HDVM) - Material Only (see Bid Booklet page 2d)		EA					
	Horn / Strobe - Install plus delivery, overhead, tax only		EA					
	Horn / Strobe - WP (GE Security EST3: GIRF-HDVM) - Material Only (see Bid Booklet page 2d)		EA					
	Horn / Strobe - WP - Install plus delivery, overhead, tax only		EA					
	Strobe (GE Security EST3: GIRF-VM) - Material Only (see Bid Booklet page 2d)		EA					
	Strobe - Install plus delivery, overhead, tax only		EA					
	B, electric bell (GE Security EST3: 493-10AW-R) - Material Only (see Bid Booklet page 2d)		EA					
	B, electric bell - Install plus delivery, overhead, tax only		EA					
	FSD		EA					

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NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

**CONTRACTOR BID BREAKDOWN FORM**

PROJECT TITLE  
PROJECT LOCATION  
BIDDER:

NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
283111	Electric Feed - FACP, 3/4"C, 1#10 + 1#10N + 1#10G		LF					
	Fire alarm wiring		LF					
	Testing		LS					
	subtotal							
310000	DIVISION 31 - EARTHWORK							
031200	Earthwork							
	Excavation for water line		CY					
	Sand Bedding		CY					
	Backfill		CY					
	Disposal		CY					
	8 x 6 elevator pit & sump pit: concrete SOG & walls, waterproofing, ladder, excavation & disposal @ basement		EA					
	subtotal							
	<b>TOTAL CONTRACT 1 - GENERAL CONSTRUCTION WORK</b>							

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**PLA PROJECT**

**ATTACHMENT 1 - BID INFORMATION  
PROJECT ID: LNEMA08WS**

**DESCRIPTION AND LOCATION OF WORK:**

**Woodstock Branch Library Renovation and ADA Compliance**  
761 East 160<sup>th</sup> Street  
Bronx, NY 10456  
E-PIN: 85013B0094 / DDC PIN: 8502013LN0002C

**DOCUMENTS AVAILABLE AT:**

Department of Design and Construction, Contract Section  
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

**SUBMISSION OF BIDS BEFORE BID OPENING:**

**TIME TO SUBMIT:**

On or Before: **TUESDAY, JULY 23<sup>RD</sup>, 2013**

**BIDS MUST BE CLOCKED IN PRIOR TO BID OPENING**

**PLACE TO SUBMIT:**

Department of Design and Construction, Contract Section (located behind Security Desk)  
30-30 Thomson Avenue - First Floor, Long Island City, NY 11101

**BID OPENING:**

<b>PLACE OF BID OPENING:</b>	Department of Design and Construction Contract Section 30-30 Thomson Avenue – First Floor Long Island City, NY 11101
<b>DATE AND HOUR:</b>	<b>TUESDAY, JULY 23, 2013 @ 2:00 PM</b>
	<b>LATE BIDS WILL NOT BE ACCEPTED</b>

**PRE-BID CONFERENCE**

<b>PLACE</b>	Woodstock Branch Library 761 East 160 <sup>th</sup> Street Bronx, NY 10456
<b>DATE AND HOUR</b>	<b>TUESDAY, JULY 9, 2013 AT 10:00AM</b>
<b>MANDATORY OR OPTIONAL</b>	<b>OPTIONAL</b>

**BID SECURITY:**

Bid Security is required in the amount set forth below; provided, however, bid security is not required if the TOTAL BID PRICE set forth on the Bid Form is less than \$1,000,000.

- (1) Bond in an amount not less than 10% of the TOTAL BID PRICE set forth on the Bid Form, OR
- (2) Certified Check in an amount not less than 2% of the TOTAL BID PRICE set forth on the Bid Form

**PERFORMANCE AND PAYMENT SECURITY:**

Required for Contracts in excess of \$1,000,000.00. Performance and Payment Security shall each be in an amount equal to 100% of the Contract Price

**AGENCY CONTACT PERSON:**

Lorraine Holley, 30-30 Thomson Avenue - First Floor, Long Island City, Queens, NY 11101  
Telephone (718) 391-2200 or (718) 391-2601 Fax: (718) 391-2615

**BID BOOKLET  
PART B**

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## SAFETY QUESTIONNAIRE

The bidder must include, with its bid, all information requested on this Safety Questionnaire. Failure to provide a completed and signed Safety Questionnaire at the time of bid opening may result in disqualification of the bid as non-responsive.

### 1. Bidder Information:

Company Name: \_\_\_\_\_

DDC Project Number: \_\_\_\_\_

Company Size:        \_\_\_\_\_ Ten (10) employees or less  
                               \_\_\_\_\_ Greater than ten (10) employees

\_\_\_\_\_ Company has previously worked for DDC

### 2. Type(s) of Construction Work

TYPE OF WORK	LAST 3 YEARS	THIS PROJECT
General Building Construction	_____	_____
Residential Building Construction	_____	_____
Nonresidential Building Construction	_____	_____
Heavy Construction, except building	_____	_____
Highway and Street Construction	_____	_____
Heavy Construction, except highways	_____	_____
Plumbing, Heating, HVAC	_____	_____
Painting and Paper Hanging	_____	_____
Electrical Work	_____	_____
Masonry, Stonework and Plastering	_____	_____
Carpentry and Floor Work	_____	_____
Roofing, Siding, and Sheet Metal	_____	_____
Concrete Work	_____	_____
Specialty Trade Contracting	_____	_____
Asbestos Abatement	_____	_____
<b>Other (specify)</b>	_____	_____
_____	_____	_____

### 3. Experience Modification Rate:

The Experience Modification Rate (EMR) is a rating generated by the National Council of Compensation Insurance (NCCI). This rating is used to determine the contractor's premium for worker's compensation insurance. The contractor may obtain its EMR by contacting its insurance broker or the NCCI. If the contractor cannot obtain its EMR, it must submit a written explanation as to why.

The Contractor must indicate its Intrastate and Interstate EMR for the past three years. [Note: For contractors with less than three years of experience, the EMR will be considered to be 1.00].

YEAR	<u>INTRASTATE RATE</u>	<u>INTERSTATE RATE</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the Intrastate and/or Interstate EMR for any of the past three years is greater than 1.00, the contractor must attach, to this questionnaire, a written explanation for the rating and identify what corrective action was taken to correct the situation resulting in that rating.

**4. OSHA Information:**

\_\_\_\_\_ Contractor has received a willful violation issued by OSHA or New York City Department of Buildings (NYCDOB) within the last three years.

\_\_\_\_\_ Contractor has had an incident requiring OSHA notification within 8 hours (i.e., fatality, or hospitalization of three or more employees).

The Occupational Safety and Health Act (OSHA) of 1970 requires employers with ten or more employees, on a yearly basis to complete and maintain on file the form entitled "Log of Work-related Injuries and Illnesses". This form is commonly referred to as the OSHA 300 Log (OSHA 200 Log for 2001 and earlier).

The OSHA 300 Log must be submitted for the last three years for contractors with more than ten employees.

The Contractor must indicate the total number of hours worked by its employees, as reflected in payroll records for the past three years.

**The contractor must submit the Incident Rate for Lost Time Injuries (the Incident Rate) for the past three years. The Incident Rate is calculated in accordance with the formula set forth below. For each given year, the total number of incidents is the total number of non-fatal injuries and illnesses reported on the OSHA 300 Log. The 200,000 hours represents the equivalent of 100 employees working forty hours a week, fifty weeks per year.**

Incident Rate = 
$$\frac{\text{Total Number of Incidents X 200,000}}{\text{Total Number of Hours Worked by Employees}}$$

YEAR	TOTAL NUMBERS OF HOURS WORKED BY EMPLOYEES	INCIDENT RATE
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the contractor's Incident Rate for any of the past three years is one point higher than the Incident Rate for the type of construction it performs (listed below), the contractor must attach, to this questionnaire, a written explanation for the relatively high rate.

General Building Construction	8.5
Residential Building Construction	7.0
Nonresidential Building Construction	10.2
Heavy Construction, except building	8.7
Highway and Street Construction	9.7
Heavy Construction, except highways	8.3
Plumbing, Heating, HVAC	11.3
Painting and Paper Hanging	6.9
Electrical Work	9.5
Masonry, Stonework and Plastering	10.5
Carpentry and Floor Work	12.2
Roofing, Siding, and Sheet Metal	10.3
Concrete Work	8.6
Specialty Trade Contracting	8.6

**5. Safety Performance on Previous DDC Project(s)**

\_\_\_\_\_ Contractor previously audited by the DDC Office of Site Safety.

DDC Project Number(s): \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_ Accident on previous DDC Project(s).

\_\_\_\_\_ Fatality or Life-altering Injury on DDC Project(s) within the last three years.  
 [Examples of a life-altering injury include loss of limb, loss of a sense (e.g., sight, hearing), or loss of neurological function].

Date: \_\_\_\_\_

By: \_\_\_\_\_  
 (Signature of Owner, Partner, Corporate Officer)

Title: \_\_\_\_\_

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## Pre-Award Process

The bidder is advised that as part of the pre-award review of its bid, it may be required to submit the information described in Sections (A) through (D) below. If required, the bidder must submit such information within five (5) business days following receipt of notification from DDC that it is among the low bidders. Such notification from DDC will be by facsimile or in writing and will specify the types of information which must be submitted.

**In the event the bidder fails to submit the required information within the specified time frame, its bid may be rejected as nonresponsive.**

\*\*\*\*\*

- (A) **Project Reference Form:** If required, the bidder must complete and submit the Project Reference Form set forth on pages 28 through 30 of this Bid Booklet. The Project Reference Form consists of 3 parts: (1) Similar Contracts Completed by the Bidder, (2) Contracts Currently Under Construction by the Bidder, and (3) Pending Contracts Not Yet Started by the Bidder.
- (B) **Copy of License:** If required, the bidder must submit a copy of the license under which the bidder will be performing the work. Such license must clearly show the following: (1) Name of the Licensee, (2) License Number, and (3) Expiration date of the License. A copy of the license will be required from bidders for the following contracts: Plumbing Work, Electrical Work and Asbestos Abatement.
- (C) **Financial Information:** If required, the bidder must submit the financial information described below:

- (1) **Audited Financial Statements:** Financial statements (Balance Sheet and Income Statement) of the entity submitting the bid, as audited by an independent auditor licensed to practice as a certified public accountant (CPA). Audited financial statements for the three most recent fiscal years must be submitted. Each such financial statement must include the auditor's standard report.

If the bidder does not have audited financial statements, it must submit an affidavit attesting to the fact that the bidder does not have such statements. In addition, the bidder must submit the following documentation covering the three most recent fiscal years: signed federal tax returns, unaudited financial statements, and a "certified review letter" from a certified public accountant (CPA) verifying the unaudited financial statements.

Unless the most recent audited or unaudited financial statement was issued within ninety (90) days, the bidder must submit interim financial information that includes data on financial position and results of operation (income data) for the current fiscal year. Such information may be summarized on a monthly or quarterly basis or at other intervals.

- (2) **Schedule of Aged Accounts Receivable,** including portion due within ninety (90) days.
- (D) **Project Specific Information:** If required, the bidder must submit the project specific information described below:
- (1) Statement indicating the number of years of experience the bidder has had and in what type of construction.
- (2) Resumes of all key personnel to be involved in the project, including the proposed project superintendent.
- (3) List of significant pieces of equipment expected to be used for the contract, and whether such equipment is owned or leased.

- (4) Description of work expected to be subcontracted, and to what firms, if known.
- (5) List of key material suppliers.
- (6) Preliminary bar chart time schedule
- (7) Contractor's expected means of financing the project. This should be based on the assumption that the contractor is required to finance 2X average monthly billings throughout the contract period.
- (8) Any other issues the contractor sees as impacting his ability to complete the project according to the contract.

In addition to the information described in Sections (A) through (D) above, the bidder shall submit such additional information as the Commissioner may require, including without limitation, an explanation or justification for specific unit price items.

The bidder is further advised that it may be required to attend a pre-award meeting with DDC representatives. If such a meeting is convened, the bidder will be advised as to any additional material to be provided.

**A. PROJECT REFERENCES – SIMILAR CONTRACTS COMPLETED BY THE BIDDER**

List all contracts substantially completed within the last 4 years similar to the contract being awarded, up to a maximum of 10, in descending order of date of substantial completion.

Project & Location	Contract Type	Contract Amount (\$000)	Date Completed	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. if different from owner

**B. PROJECT REFERENCES – CONTRACTS CURRENTLY UNDER CONSTRUCTION BY THE BIDDER**

List all contracts currently under construction even if they are not similar to the contract being awarded.

Project & Location	Contract Type	Contract Amount (\$000)	Subcontracted to Others (\$000)	Uncompleted Portion (\$000)	Date Scheduled to Complete	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. if different from owner

**C. PROJECT REFERENCES – PENDING CONTRACTS NOT YET STARTED BY THE BIDDER**

List all contracts awarded to or won by the bidder but not yet started.

Project & Location	Contract Type	Contract Amount (\$000)	Date Scheduled to Start	Owner Reference & Tel. No.	Architect/Engineer Reference & Tel. No. if different from owner

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**OFFICE OF THE MAYOR  
BUREAU OF LABOR SERVICES  
CONTRACT CERTIFICATE**

To be completed if the contract is less than \$1,000,000

Contractor: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone Number: \_\_\_\_\_

Name and Title of Signatory: \_\_\_\_\_  
\_\_\_\_\_

Contracting Agency or Owner: \_\_\_\_\_

Project Number: \_\_\_\_\_

Proposed Contract Amount: \_\_\_\_\_

Description and Address of Proposed Contract: \_\_\_\_\_

Names of Subcontractors in the amount of 750,000 or more on this contract (if not known at this time, so state indicating that trades will be subcontracted):  
\_\_\_\_\_  
\_\_\_\_\_

I, (fill in name of person signing) \_\_\_\_\_,  
hereby affirm that I am authorized by the above-named contractor to certify that said contractor's  
proposed contract with the above-named owner or city agency is less than \$1,000,000. This affirmation  
is made in accordance with Executive Order No. 50 (1980) as amended and its implementing regulations.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

**WILLFUL OR FRAUDULENT FALSIFICATION OF ANY DATA OR INFORMATION  
SUBMITTED HEREWITH MAY RESULT IN THE TERMINATION OF ANY CONTRACT BETWEEN  
THE CITY AND THE BIDDER OR CONTRACTOR AND BAR THE BIDDER OR CONTRACTOR FROM  
PARTICIPATION IN ANY CITY CONTRACT FOR A PERIOD OF UP TO THREE YEARS. FURTHER,  
SUCH FALSIFICATION MAY RESULT IN CRIMINAL PROSECUTION.**

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## VENDEX COMPLIANCE

(A) **Vendex Fees:** Pursuant to Procurement Policy Board Rule 2-08(f)(2), the contractor will be charged a fee for the administration of the VENDEX system, including the Vendor Name Check process, if a Vendor Name Check review is required to be conducted by the Department of Investigation. The contractor shall also be required to pay the applicable required fees for any of its subcontractors for which Vendor Name Check reviews are required. The fee(s) will be deducted from payments made to the contractor under the contract. For contracts with an estimated value of less than or equal to \$1,000,000, the fee will be \$175 per Vendor Name Check review. For contracts with an estimated value of greater than \$1,000,000, the fee will be \$350 per Vendor Name Check review.

(B) **Confirmation of Vendex Compliance:** The Bidder shall submit this Confirmation of Vendex Compliance to the Department of Design and Construction, Contracts Section, 30-30 Thomson Avenue – First Floor, Long Island City, NY 11101.

**Bid Information:** The Bidder shall complete the bid information set forth below.

Name of Bidder: \_\_\_\_\_  
Bidder's Address: \_\_\_\_\_  
Bidder's Telephone Number: \_\_\_\_\_  
Bidder's Fax Number: \_\_\_\_\_  
Date of Bid Opening: \_\_\_\_\_  
Project ID: \_\_\_\_\_

**Vendex Compliance:** To demonstrate compliance with Vendex requirements, the Bidder shall complete either Section (1) or Section (2) below, whichever applies.

- (1) **Submission of Vendex Questionnaires to MOCS:** By signing in the space provided below, the Bidder certifies that as of the date specified below, the Bidder has submitted Vendex Questionnaires to the Mayor's Office of Contract Services, Attn: VENDEX, 253 Broadway, 9<sup>th</sup> Floor, New York, New York 10007.

Date of Submission: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature of Partner or corporate officer)

Print Name: \_\_\_\_\_

- (2) **Submission of Certification of No Change to DDC:** By signing in the space provided below, the Bidder certifies that it has read the instructions in a "Vendor's Guide to Vendex" and that such instructions do not require the Bidder to submit Vendex Questionnaires. The Bidder has completed **TWO ORIGINALS** of the Certification of No Change set forth on the next page of this Bid Booklet.

By: \_\_\_\_\_  
(Signature of Partner or corporate officer)

Print Name: \_\_\_\_\_

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# Principal Questionnaire

*This section refers to the most recent principal questionnaire submissions.*

	Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on submission of change
1			
2			
3			
4			
5			
6			

Check if additional changes were submitted and attach a document with the date of additional submissions.

## Certification *This section is required.*

*This form must be signed and notarized. Please complete this twice. Copies will not be accepted.*

### Certified By:

\_\_\_\_\_  
*Name (Print)*

\_\_\_\_\_  
*Title*

\_\_\_\_\_  
*Name of Submitting Entity*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Date*

### Notarized By:

\_\_\_\_\_  
*Notary Public*

\_\_\_\_\_  
*County License Issued*

\_\_\_\_\_  
*License Number*

Sworn to before me on: \_\_\_\_\_  
*Date*

# Certificate of No Change Form

- Please submit two completed forms. Copies will not be accepted.
- Please send both copies to the agency that requested it, unless you are advised to send it directly to the Mayor's Office of Contract Services (MOCS).
- A materially false statement willfully or fraudulently made in connection with this certification, and/or the failure to conduct appropriate due diligence in verifying the information that is the subject of this certification, may result in rendering the submitting entity non-responsible for the purpose of contract award.
- A materially false statement willfully or fraudulently made in connection with this certification may subject the person making the false statement to criminal charges

I, \_\_\_\_\_, being duly sworn, state that I have read  
*Enter Your Name*

and understand all the items contained in the vendor questionnaire and any submission of change as identified on page one of this form and certify that as of this date, these items have not changed. I further certify that, to the best of my knowledge, information and belief, those answers are full, complete, and accurate; and that, to the best of my knowledge, information, and belief, those answers continue to be full, complete, and accurate.

In addition, I further certify on behalf of the submitting vendor that the information contained in the principal questionnaire(s) and any submission of change identified on page two of this form have not changed and have been verified and continue, to the best of my knowledge, to be full, complete and accurate.

I understand that the City of New York will rely on the information supplied in this certification as additional inducement to enter into a contract with the submitting entity.

## **Vendor Questionnaire** *This section is required.*

*This refers to the vendor questionnaire(s) submitted for the vendor doing business with the City.*

Name of Submitting Entity: \_\_\_\_\_

Vendor's Address: \_\_\_\_\_

Vendor's EIN or TIN: \_\_\_\_\_ Requesting Agency: \_\_\_\_\_

Are you submitting this Certification as a parent? (Please circle one)      Yes      No

Signature date on the last full vendor questionnaire signed for the submitting vendor: \_\_\_\_\_

Signature date on change submission for the submitting vendor: \_\_\_\_\_

# Principal Questionnaire

*This section refers to the most recent principal questionnaire submissions.*

	Principal Name	Date of signature on last full Principal Questionnaire	Date(s) of signature on submission of change
1			
2			
3			
4			
5			
6			

Check if additional changes were submitted and attach a document with the date of additional submissions.

## Certification *This section is required.*

*This form must be signed and notarized. Please complete this twice. Copies will not be accepted.*

### Certified By:

\_\_\_\_\_  
*Name (Print)*

\_\_\_\_\_  
*Title*

\_\_\_\_\_  
*Name of Submitting Entity*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Date*

### Notarized By:

\_\_\_\_\_  
*Notary Public*

\_\_\_\_\_  
*County License Issued*

\_\_\_\_\_  
*License Number*

Sworn to before me on: \_\_\_\_\_  
*Date*

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Vendor's Address: \_\_\_\_\_

Vendor's EIN or TIN: \_\_\_\_\_ Requesting Agency: \_\_\_\_\_

Are you submitting this Certification as a parent? (Please circle one)      Yes      No

Signature date on the last full vendor questionnaire signed for the submitting vendor: \_\_\_\_\_

Signature date on change submission for the submitting vendor: \_\_\_\_\_

**IRAN DIVESTMENT ACT COMPLIANCE RIDER**  
**FOR NEW YORK CITY CONTRACTORS**

The Iran Divestment Act of 2012, effective as of April 12, 2012, is codified at State Finance Law (“SFL”) §165-a and General Municipal Law (“GML”) §103-g. The Iran Divestment Act, with certain exceptions, prohibits municipalities, including the City, from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in SFL §165-a and GML §103-g, a person engages in investment activities in the energy sector of Iran if:

- (a) The person provides goods or services of twenty million dollars or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
- (b) The person is a financial institution that extends twenty million dollars or more in credit to another person, for forty-five days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to paragraph (b) of subdivision three of Section 165-a of the State Finance Law and maintained by the Commissioner of the Office of General Services.

A bid or proposal shall not be considered for award nor shall any award be made where the bidder or proposer fails to submit a signed and verified bidder’s certification.

Each bidder or proposer must certify that it is not on the list of entities engaged in investment activities in Iran created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. In any case where the bidder or proposer cannot certify that they are not on such list, the bidder or proposer shall so state and shall furnish with the bid or proposal a signed statement which sets forth in detail the reasons why such statement cannot be made. The City of New York may award a bid to a bidder who cannot make the certification on a case by case basis if:

- (1) The investment activities in Iran were made before the effective date of this section (i.e., April 12, 2012), the investment activities in Iran have not been expanded or renewed after the effective date of this section and the person has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran: or
- (2) The City makes a determination that the goods or services are necessary for the City to perform its functions and that, absent such an exemption, the City would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

**BIDDER'S CERTIFICATION OF COMPLIANCE WITH  
IRAN DIVESTMENT ACT**

Pursuant to General Municipal Law §103-g, which generally prohibits the City from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

[Please Check One]

**BIDDER'S CERTIFICATION**

- By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.
- I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: \_\_\_\_\_, New York  
\_\_\_\_\_, 20\_\_

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
PRINTED NAME

\_\_\_\_\_  
TITLE

Sworn to before me this  
\_\_\_\_ day of \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
Notary Public

Dated:

**CITY OF NEW YORK**

**DIVISION OF LABOR SERVICES**

**CONSTRUCTION EMPLOYMENT REPORT**

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### CONSTRUCTION EMPLOYMENT REPORT

#### GENERAL INFORMATION

1. Your contractual relationship in this contract is: Prime contractor \_\_\_\_\_ Subcontractor \_\_\_\_\_
- 1a. Are M/WBE goals attached to this project? Yes \_\_\_\_\_ No \_\_\_\_\_
2. Please check one of the following if your firm would like information on how to certify with the City of New York as a:  
\_\_\_\_ Minority Owned Business Enterprise \_\_\_\_\_ Locally based Business Enterprise  
\_\_\_\_ Women Owned Business Enterprise \_\_\_\_\_ Emerging Business Enterprise
- 2a. If you are certified as an **MBE, WBE, or LBE**, what city/state agency are you certified with?  
\_\_\_\_\_ Are you DBE certified? Yes \_\_\_\_\_ No \_\_\_\_\_
3. Please indicate if you would like assistance from SBS in identifying certified M/WBEs for contracting opportunities: Yes \_\_\_\_\_ No \_\_\_\_\_
4. Is this project subject to a project labor agreement? Yes \_\_\_\_\_ No \_\_\_\_\_

#### PART I: CONTRACTOR/SUBCONTRACTOR INFORMATION

5. \_\_\_\_\_  
Employer Identification Number or Federal Tax I.D./ \_\_\_\_\_ Email Address
6. \_\_\_\_\_  
Company Name
7. \_\_\_\_\_  
Company Address and Zip Code
8. \_\_\_\_\_  
Chief Operating Officer \_\_\_\_\_ Telephone Number
9. \_\_\_\_\_  
Designated Equal Opportunity Compliance Officer \_\_\_\_\_ Telephone Number  
(If same as Item #7, write "same")
10. \_\_\_\_\_  
Name of Prime Contractor and Contact Person  
(If same as Item #5, write "same")
11. Number of employees in your company: \_\_\_\_\_

12. Contract information:

- (a) \_\_\_\_\_  
Contracting Agency (City Agency)
- (b) \_\_\_\_\_  
Contract Amount
- (d) \_\_\_\_\_  
Procurement Identification Number (PIN)
- (e) \_\_\_\_\_  
Contract Registration Number (CT#)
- (f) \_\_\_\_\_  
Projected Commencement Date
- (g) \_\_\_\_\_  
Projected Completion Date

(h) Description and location of proposed contract:  
\_\_\_\_\_  
\_\_\_\_\_

13. Has your firm been reviewed by the Division of Labor Services (DLS) within the past 36 months and issued a Certificate of Approval? Yes\_\_\_ No\_\_\_

If yes, attach a copy of certificate.

14. Has DLS within the past month reviewed an Employment Report submission for your company and issued a Conditional Certificate of Approval? Yes\_\_\_ No\_\_\_

If yes, attach a copy of certificate.

**NOTE: DLS WILL NOT ISSUE A CONTINUED CERTIFICATE OF APPROVAL IN CONNECTION WITH THIS CONTRACT UNLESS THE REQUIRED CORRECTIVE ACTIONS IN PRIOR CONDITIONAL CERTIFICATES OF APPROVAL HAVE BEEN TAKEN.**

15. Has an Employment Report already been submitted for a different contract (not covered by this Employment Report) for which you have not yet received compliance certificate?  
Yes\_\_\_ No\_\_\_ If yes,

Date submitted: \_\_\_\_\_  
Agency to which submitted: \_\_\_\_\_  
Name of Agency Person: \_\_\_\_\_  
Contract No: \_\_\_\_\_  
Telephone: \_\_\_\_\_

16. Has your company in the past 36 months been audited by the United States Department of Labor, Office of Federal Contract Compliance Programs (OFCCP)? Yes\_\_\_ No\_\_\_

If yes,

(a) Name and address of OFCCP office.  
\_\_\_\_\_  
\_\_\_\_\_

(b) Was a Certificate of Equal Employment Compliance issued within the past 36 months?  
Yes\_\_\_ No\_\_\_

If yes, attach a copy of such certificate.

(c) Were any corrective actions required or agreed to? Yes\_\_\_ No\_\_\_

If yes, attach a copy of such requirements or agreements.

(d) Were any deficiencies found? Yes\_\_\_ No\_\_\_

If yes, attach a copy of such findings.

17. Is your company or its affiliates a member or members of an employers' trade association which is responsible for negotiating collective bargaining agreements (CBA) which affect construction site hiring? Yes\_\_\_ No\_\_\_

If yes, attach a list of such associations and all applicable CBA's.

## PART II: DOCUMENTS REQUIRED

18. For the following policies or practices, attach the relevant documents (e.g., printed booklets, brochures, manuals, memoranda, etc.). If the policy(ies) are unwritten, attach a full explanation of the practices. See instructions.

- \_\_\_ (a) Health benefit coverage/description(s) for all management, nonunion and union employees (whether company or union administered)
- \_\_\_ (b) Disability, life, other insurance coverage/description
- \_\_\_ (c) Employee Policy/Handbook
- \_\_\_ (d) Personnel Policy/Manual
- \_\_\_ (e) Supervisor's Policy/Manual
- \_\_\_ (f) Pension plan or 401k coverage/description for all management, nonunion and union employees, whether company or union administered
- \_\_\_ (g) Collective bargaining agreement(s).
- \_\_\_ (h) Employment Application(s)
- \_\_\_ (i) Employee evaluation policy/form(s).
- \_\_\_ (j) Does your firm have medical and/or non-medical (i.e. education, military, personal, pregnancy, child care) leave policy?

19. To comply with the Immigration Reform and Control Act of 1986 when and of whom does your firm require the completion of an I-9 Form?

- |  |              |
|--|--------------|
| (a) Prior to job offer                     | Yes___ No___ |
| (b) After a conditional job offer          | Yes___ No___ |
| (c) After a job offer                      | Yes___ No___ |
| (d) Within the first three days on the job | Yes___ No___ |
| (e) To some applicants                     | Yes___ No___ |
| (f) To all applicants                      | Yes___ No___ |
| (g) To some employees                      | Yes___ No___ |
| (h) To all employees                       | Yes___ No___ |

20. Explain where and how completed I-9 Forms, with their supportive documentation, are maintained and made accessible.

\_\_\_\_\_  
\_\_\_\_\_

21. Does your firm or any of its collective bargaining agreements require job applicants to take a medical examination? Yes\_\_\_ No\_\_\_

If yes, is the medical examination given:

- (a) Prior to a job offer Yes\_\_\_ No\_\_\_  
(b) After a conditional job offer Yes\_\_\_ No\_\_\_  
(c) After a job offer Yes\_\_\_ No\_\_\_  
(d) To all applicants Yes\_\_\_ No\_\_\_  
(e) Only to some applicants Yes\_\_\_ No\_\_\_

If yes, list for which applicants below and attach copies of all medical examination or questionnaire forms and instructions utilized for these examinations.

\_\_\_\_\_  
\_\_\_\_\_

22. Do you have a written equal employment opportunity (EEO) policy? Yes\_\_\_ No\_\_\_

If yes, list the document(s) and page number(s) where these written policies are located.

\_\_\_\_\_  
\_\_\_\_\_

23. Does the company have a current affirmative action plan(s) (AAP)

- \_\_\_ Minorities and Women  
\_\_\_ Individuals with handicaps  
\_\_\_ Other. Please specify \_\_\_\_\_

24. Does your firm or collective bargaining agreement(s) have an internal grievance procedure with respect to EEO complaints? Yes\_\_\_ No\_\_\_

If yes, please attach a copy of this policy.

If no, attach a report detailing your firm's unwritten procedure for handling EEO complaints.

25. Has any employee, within the past three years, filed a complaint pursuant to an internal grievance procedure or with any official of your firm with respect to equal employment opportunity? Yes\_\_\_ No\_\_\_

If yes, attach an internal complaint log. See instructions.

26. Has your firm, within the past three years, been named as a defendant (or respondent) in any administrative or judicial action where the complainant (plaintiff) alleged violation of any anti-discrimination or affirmative action laws? Yes\_\_\_ No\_\_\_

If yes, attach a log. See instructions.

27. Are there any jobs for which there are physical qualifications? Yes\_\_\_ No\_\_\_

If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

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28. Are there any jobs for which there are age, race, color, national origin, sex, creed, disability, marital status, sexual orientation, or citizenship qualifications? Yes\_\_\_ No\_\_\_

If yes, list the job(s), submit a job description and state the reason(s) for the qualification(s).

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**SIGNATURE PAGE**

I, (print name of authorized official signing) \_\_\_\_\_ hereby certify that the information submitted herewith is true and complete to the best of my knowledge and belief and submitted with the understanding that compliance with New York City's equal employment requirements, as contained in Chapter 56 of the City Charter, Executive Order No. 50 (1980), as amended, and the implementing Rules and Regulations, is a contractual obligation.

I also agree on behalf of the company to submit a certified copy of payroll records to the Division of Labor Services on a monthly basis.

\_\_\_\_\_  
Contractor's Name

\_\_\_\_\_  
Name of person who prepared this Employment Report Title

\_\_\_\_\_  
Name of official authorized to sign on behalf of the contractor Title

\_\_\_\_\_  
Telephone Number

\_\_\_\_\_  
Signature of authorized official Date

If contractors are found to be underutilizing minorities and females in any given trade based on Chapter 56 Section 3H, the Division of Labor Services reserves the right to request the contractor's workforce data and to implement an employment program.

Contractors who fail to comply with the above mentioned requirements or are found to be in noncompliance may be subject to the withholding of final payment.

Willful or fraudulent falsifications of any data or information submitted herewith may result in the termination of the contract between the City and the bidder or contractor and in disapproval of future contracts for a period of up to five years. Further, such falsification may result in civil and/or criminal prosecution.

To the extent permitted by law and consistent with the proper discharge of DLS' responsibilities under Charter Chapter 56 of the City Charter and Executive Order No. 50 (1980) and the implementing Rules and Regulations, all information provided by a contractor to DLS shall be confidential.

**Only original signatures accepted.**

Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_\_

\_\_\_\_\_  
Notary Public

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Date

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FMS ID: LNEMA08WS



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**THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE                      LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000                WEBSITE [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc)

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**Contract for Furnishing all Labor and Material Necessary and Required for:**

**CONTRACT NO. 1            GENERAL CONSTRUCTION WORK**

# **Woodstock Branch Library Renovation and ADA Compliance**

**LOCATION:                      761 East 160th Street  
BOROUGH:                    Bronx 10456  
CITY OF NEW YORK**

---

\_\_\_\_\_  
Contractor

Dated \_\_\_\_\_, 20\_\_\_\_

---

Entered in the Comptroller's Office

\_\_\_\_\_  
First Assistant Bookkeeper

Dated \_\_\_\_\_, 20\_\_\_\_





PROJECT ID: LNEMA08WS

**THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE  
LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000  
WEBSITE [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc)

**VOLUME 2 OF 3**

**PROJECT LABOR AGREEMENT  
INFORMATION FOR BIDDERS  
CONTRACT  
PERFORMANCE AND PAYMENT BONDS  
SCHEDULE OF PREVAILING WAGES  
GENERAL CONDITIONS**

FOR FURNISHING ALL LABOR AND MATERIALS  
NECESSARY AND REQUIRED FOR THE PROJECT

**Woodstock Branch Library Renovation  
and ADA Compliance**

LOCATION:  
BOROUGH:  
CITY OF NEW YORK

761 East 160th Street  
Bronx 10456

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

NYPL

RICE + LIPKA ARCHITECTS

Date: March 14, 2013

3-039





NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

**THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE  
LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000  
WEBSITE [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc)

**VOLUME 2 OF 3**

**PROJECT LABOR AGREEMENT  
INFORMATION FOR BIDDERS  
CONTRACT  
PERFORMANCE AND PAYMENT BONDS  
SCHEDULE OF PREVAILING WAGES  
GENERAL CONDITIONS**

FOR FURNISHING ALL LABOR AND MATERIALS  
NECESSARY AND REQUIRED FOR THE PROJECT



## NOTICE:

### THIS CONTRACT IS NOT SUBJECT TO THE REQUIREMENTS OF THE WICKS LAW FOR SEPARATE PRIME CONTRACTORS

This contract is subject to a Project Labor Agreement ("PLA"). In accordance with the Labor Law, the requirements of the Wicks Law for separate prime contractors do not apply to any project that is covered by a PLA. Accordingly, the requirements of the Wicks Law for separate prime contractors do not apply to this Project. However, the Contract Documents for this Project (General Conditions, Drawings and Specifications) were prepared as if the requirements of the Wicks Law for separate prime contractors did apply. To correct this situation, the bidder is advised that the Contract Documents are revised as set forth below.

- (A) Delete any and all references to separate responsibilities, separate specifications, separate drawings and/or separate contracts for the four subdivisions of the work listed below:
- General Construction Work (Contract No. 1)
  - Plumbing Work (Contract No. 2)
  - HVAC & Fire Protection Work (Contract No. 3)
  - Electrical Work (Contract No. 4)
- (B) Revise all such references to indicate that:
- The Project consists of a single contract, the Contract for General Construction Work.
  - All responsibilities and obligations in the Contract Documents assigned to the separate Contractors for the four subdivisions of the work listed above are the responsibility of the Contractor for General Construction Work.
  - The Contractor for General Construction Work is responsible for the performance of all required work for the Project as set forth in the Contract Documents, including all responsibilities and obligations assigned to the separate Contractors for the four subdivisions of the work listed above.
- (C) Revise any and all references to Contacts Nos. 2, 3 and 4 to refer to Contract No. 1.
- (D) Revise the specifications for plumbing work to require Contractor for General Construction Work to engage a Licensed Plumber to perform the required plumbing work.
- (E) Revise the specifications for electrical work to require Contractor for General Construction Work to engage a Licensed Electrician to perform the required electrical work.

## NOTICE:

# THIS CONTRACT IS SUBJECT TO A PROJECT LABOR AGREEMENT

This contract is subject to the attached Project Labor Agreement ("PLA") entered into between the City and the Building and Construction Trades Council of Greater New York ("BCTC") affiliated Local Unions. By submitting a bid, the Contractor agrees that if awarded the Contract the PLA is binding on the Contractor and all subcontractors of all tiers. The bidder to be awarded the contract will be required to execute the attached Letter of Assent prior to award. Contractor shall include in any subcontract a requirement that the subcontractor, and sub-subcontractors of all tiers, become signatory to and bound to the ~~PLA~~ with respect to the subcontracted work. Contractor will also be required to have all subcontractors of all tiers execute the attached Letter of Assent prior to such subcontractors performing any work on the Project. Bidders are advised that the City of New York and City agencies have entered into multiple PLAs. The terms of each PLA, while similar, are not identical. All bidders should carefully read the entire PLA that governs this Contract.

To the extent that the terms of the PLA conflict with any other terms of the invitation for bids, including the Standard Construction Contract, the terms of the PLA shall govern. For example, the PLA section that authorizes the scheduling of a four-day work, ten hours per day on straight time at the commencement of the job, PLA Article 12, section 1, overrides the Standard Construction Contract's provision concerning a five-day work week with a maximum of eight hours in a day, Standard Construction Contract Article 37.2.1. Where, however, the invitation for bids, including the Standard Construction Contract, requires the approval of the City/Department, the PLA does not supersede or eliminate that requirement.

In addition to the various provisions regarding work rules, Contractors should take special note of the requirement that Contractors and Subcontractors make payments to designated employee benefit funds. See PLA Article 11, Section 2. The PLA also contains provisions for what occurs when a contractor or a subcontractor fails to make required payments into the benefit funds, including potentially the direct payment by the City to the benefit fund of monies owed and corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2. The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

This Contract is subject to the apprenticeship requirements of Labor Law §222 and to apprenticeship requirements established by the Department pursuant to Labor Law §816-b. Please be advised that the involved trades have apprenticeship programs that meet the statutory requirements of Labor Law 222(e) and the requirements set by the Department pursuant to Labor Law §816-b, contractors and subcontractors who agree to perform the Work pursuant to the PLA are participating in such apprenticeship programs within the meaning of Labor Law §222(e) and the Department's directive.

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program created by Local Law 129, the specific requirements of M/WBE participation for this Contract are set forth in Schedule B entitled the "Subcontractor Utilization Plan", and are detailed in a separate Notice to Prospective Contractors included with this bid package. If such requirements are included with this Contract, the City strongly advises Contractors to read those provisions, as well as PLA Article 4, Section 2(C), carefully. A list of M/WBE firms may be obtained from the DSBS website at [www.nyc.gov/buycertified](http://www.nyc.gov/buycertified), by emailing DSBS at [buyer@sbs.nyc.gov](mailto:buyer@sbs.nyc.gov), by calling (212) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting [www.nyc.gov/getcertified](http://www.nyc.gov/getcertified), emailing [MWBE@sbs.nyc.gov](mailto:MWBE@sbs.nyc.gov), or calling the DSBS certification helpline at (212) 513-6311.

The local collective bargaining agreements (CBAs) that are incorporated into the PLA as PLA Schedule A Agreements are available on computer disk from the Department's Contract Officer upon the request of any prospective bidder. Please note that the "PLA Schedule A" is distinct from the Department's Schedule A that is a part of this invitation for bids.

A contact list for the participating unions is set forth after the FAQs.

Below are answers to frequently asked questions (FAQs) about this PLA:

**Q1. Does a contractor need to be signatory with the unions in the NYC Building and Construction Trades Council in order to bid on projects under the PLA?**

A. No, any contractor may bid by signing and agreeing to the terms of the PLA. The contractor need not be signatory with these unions by any other labor agreement or for any other project.

**Q2. Does a contractor agreeing to the PLA and signing the Letter of Assent create a labor agreement with these unions outside of the project covered by the PLA?**

A. No, the PLA applies only to those projects that the Contractor agrees to perform under the PLA and makes no labor agreement beyond those projects.

**Q3. Does the PLA affect the subcontractors that a bidder may utilize on the project?**

A. Subject to the Department's approval of subcontractors pursuant to Article 17 of the Standard Construction Contract, a contractor may use any subcontractor, union or non-union, as long as the subcontractor signs and agrees to the terms of the PLA.

**Q4. Are bidders required to submit Letters of Assent signed by proposed subcontractors with their bid in order to be found responsive?**

A. No, bidders do not have to submit signed Letters of Assent from their subcontractors with their bid. Subcontractors, however, will be required to sign the letter of Assent prior to being approved by the Department.

**Q5. May a contractor or subcontractor use any of its existing employees to perform this work?**

A. Generally labor will be referred to the contractor from the respective signatory local unions. See PLA Article 4. However, contractors and subcontractors may continue to use up to 12% of their existing, qualifying labor force for this work, in accordance with the terms of PLA Article 4, Section 2B. Certified MWBEs for which participation goals are set pursuant to NYC Administrative Code §6-129 that are not signatory to any Schedule A CBAs may use their existing employees for the 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup> and 8<sup>th</sup> employee needed on the job if their contracts are valued at or under \$500,000. For contracts valued at above \$500,000 but under \$1,000,000, such certified MWBEs may use their own employees for the 2<sup>nd</sup>, 5<sup>th</sup> and 8<sup>th</sup> employees needed on the job in accordance with the provisions of PLA Article 4, Section 2C. If additional workers are needed by these MWBEs, the additional workers will be referred to the contractor from the signatory local unions subject to the contractor's right to meet 12% of the additional needs with its existing, qualifying employees.

**Q6. Must the City set MWBE participation goals for the particular project or contract in order for a certified MWBE to utilize the provisions of PLA Article 4, Section 2C?**

A. No. PLA Article 4, Section 2(C) specifies what categories of MWBEs are eligible to take advantage of this provision (i.e., those MWBEs for which the City is authorized to set participation goals under §6-129). For purposes of section 2(C), it is not necessary for the project to be subject to §6-129 or for the City to have actually set participation goals for the particular contract or project. The result is the same where a projects receives State funding and therefore is subject to the requirements of Article 15-A of the Executive Law.

**Q7. May a contractor bring in union members from locals that are not signatory unions?**

A. Referrals will be from the respective signatory locals and/or locals listed in schedule A of the PLA. Contractors may utilize 'traveler provisions' contained in the local collective bargaining agreements (local CBAs) where such provisions exist and/or in accordance with the provisions of PLA Article 4, Section 2.

**Q8. Does a non-union employee working under the PLA automatically become a union member?**

A. No, the non-union employee does not automatically become a union member by working on a project covered by the PLA. Non-union employees working under the PLA are subject to the union security provisions (i.e., union dues/agency shop fees) of the local CBAs while on the project. These employees will be enrolled in the appropriate benefit plans and earn credit toward various union benefit programs. See PLA Article 4, Section 6 and Article 11.

**Q9. Are all contractors and subcontractors working under the PLA, including non-union contractors and contractors signatory to collective bargaining agreements with locals other than those that are signatories to the PLA, required to make contributions to designated employee benefit funds?**

A. Contractors and subcontractors working under the PLA will be required to contribute on behalf of all employees covered by the PLA to established jointly trustee employee benefit funds designated in the Schedule A CBAs and required to be paid on public works under any applicable prevailing wage law. See PLA Article 11, Section 2. The Agency may withhold from amounts due the contractor any amounts required to be paid, but not actually paid into any such fund by the contractor or a subcontractor. See PLA Article 11, Section 2 C.

**Q10. What happens if a contractor or subcontractor fails to make a required payment to a designated employee benefit fund?**

A. The PLA sets forth a process for unions to address a contractor or a subcontractor's failure to make required payments. The process includes potentially the direct payment by the City to the benefit fund of monies owed and the corresponding withholding of payments to the Contractor. See PLA Article 11, Section 2. The City strongly advises Contractors to read these provisions carefully and to include appropriate provisions in subcontracts addressing these possibilities.

**Q11. Does signing on to the PLA satisfy the Apprenticeship Requirements established for this bid?**

A. Yes. By agreeing to perform the Work subject to the PLA, the bidder demonstrates compliance with the apprenticeship requirements imposed by this invitation for Bids.

**Q12. Does the PLA provide a standard work day across all the signatory trades?**

A. Yes, all signatory trades will work an eight (8) hour day, Monday through Friday with a day shift at straight time as the standard work week. The PLA also permits a contractor to schedule a four day [within Monday through Friday] work week, ten (10) hours per day at straight time if announced at the commencement of the project. See PLA Article 12, Section 1. This is an example where the terms of the PLA override provisions of the Standard Construction Contract (compare with section 37.2 of the Standard Construction Contract).

**Q13. Does the PLA create a common holiday schedule for all the signatory trades?**

A. Yes, the PLA recognizes eight (8) common holidays. See PLA Article 12, Section 4.

**Q14. Does the PLA provide for a standard policy for 'shift work' across all signatory trades?**

A. Yes, second and third shifts may be worked with a standard 5% premium pay. In addition, a day shift does not have to be scheduled in order to work the second and third shifts at the 1.05 hourly pay rate. See PLA Article 12, Section 3.

**Q15. May the Contractor schedule overtime work, including work on a weekend?**

A. Yes, the PLA permits the Contractor to schedule overtime work, including work on the weekends. See PLA Article 12, Sections 2, 3, and 5. To the extent that the Agency's approval is required before a Contractor may schedule or be paid for overtime, that approval is still required notwithstanding the PLA language.

**Q16. Are overtime payments affected by the PLA?**

A. Yes, all overtime pay incurred Monday through Saturday will be at time and one half (1 ½). There will be no stacking or pyramiding of overtime pay under any circumstances. See PLA Article 12, Section 2. Sunday and holiday overtime will be paid according to each trades CBA.

**Q17. Are there special provisions for Saturday work when a day is 'lost' during the week due to weather, power failure or other emergency?**

A. Yes, when this occurs the Contractor may schedule Saturday work at weekday rates. See PLA Article 12, Section 5.

**Q18. Does the PLA contain special provisions for the manning of Temporary Services?**

A. Yes. Where temporary services are required by specific request of the agency or construction manager, they shall be provided by the contractor's existing employees during working hours in which a shift is scheduled for employees of the contractor. The need for temporary services during non-working hours will be determined by the agency or construction manager. There will be no stacking of trades on temporary services. See PLA Article 15.

**Q19. What do the workers get paid when work is terminated early in a day due to inclement weather or otherwise cut short of 8 hours?**

A. The PLA provides that employees who report to work pursuant to regular schedule and not given work will be paid two hours of straight time. Work terminated early for severe weather or emergency conditions will be paid only for time actually worked. In other instances where work is terminated early, the worker will be paid for a full day. See PLA Article 12, Sections 6 and 8.

**Q20. Should a local collective bargaining agreement [local CBA] expire during the project will a work stoppage occur on a project subject to the PLA?**

A. No. All the signatory unions are bound by the 'no strike' agreement as to the PLA work. Work will continue under the PLA and the otherwise expired local CBA(s) until the new local CBA(s) are negotiated and in effect. See PLA Articles 7 and 19.

**Q21. May a contractor working under the PLA be subject to a strike or other boycott activity by a signatory union at another site while the contractor is a signatory to the PLA?**

A. Yes. The PLA applies ONLY to work under the PLA and does not regulate labor relations at other sites even if those sites are in close proximity to PLA work.

**Q22. If a contractor has worked under other PLAs in the New York City area, are the provisions in this PLA generally the same as the others?**

A. While Project Labor Agreements often look similar to each other, and particular clauses are often used in multiple agreements, each PLA is a unique document and should be examined accordingly.

**Q23. What happens if a dispute occurs between the contractor and an employee during the project?**

A. The PLA contains a grievance and arbitration process to resolve disputes between the contractor and the employees. See PLA Article 9.

**Q24. What happens if there is a dispute between locals as to which local gets to provide employees for a particular project or a particular aspect of a project?**

A. The PLA provides for jurisdictional disputes to be resolved in accordance with the NY Plan. See PLA Article 10. A copy of the NY Plan is available upon request from the Department. The PLA provides that work is not to be disrupted or interrupted pending the resolution of any jurisdictional dispute. The work proceeds as assigned by the contractor until the dispute is resolved. See PLA Article 10, Section 3.

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## CONTACT INFORMATION FOR LOCAL UNIONS

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### BLASTERS & DRILLERS LOCAL NO. 29

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### BRICKLAYERS LOCAL NO. 1

Santo Lanzafame (718) 392-0525

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Elliot Hecht, Bus. Rep.  
Raymond Kitson, Bus. Rep.  
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Carl Tully, Bus. Agent  
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PLA-Union Contact List\_rev

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Donald Doherty Jr. Bus. Agent at Large  
Dudley Kinsley, Bus. Agent  
Michael Apuzzo, Bus. Agent  
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Anthony Marino, President

**ROOFERS & WATERPROOFERS NO. 8**

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NYC AGENCY RENOVATION & REHAB OF CITY OWNED BUILDINGS/STRUCTURES

**PROJECT LABOR AGREEMENT**

**COVERING SPECIFIED**

**RENOVATION & REHABILITATION  
OF CITY OWNED BUILDINGS AND STRUCTURES**

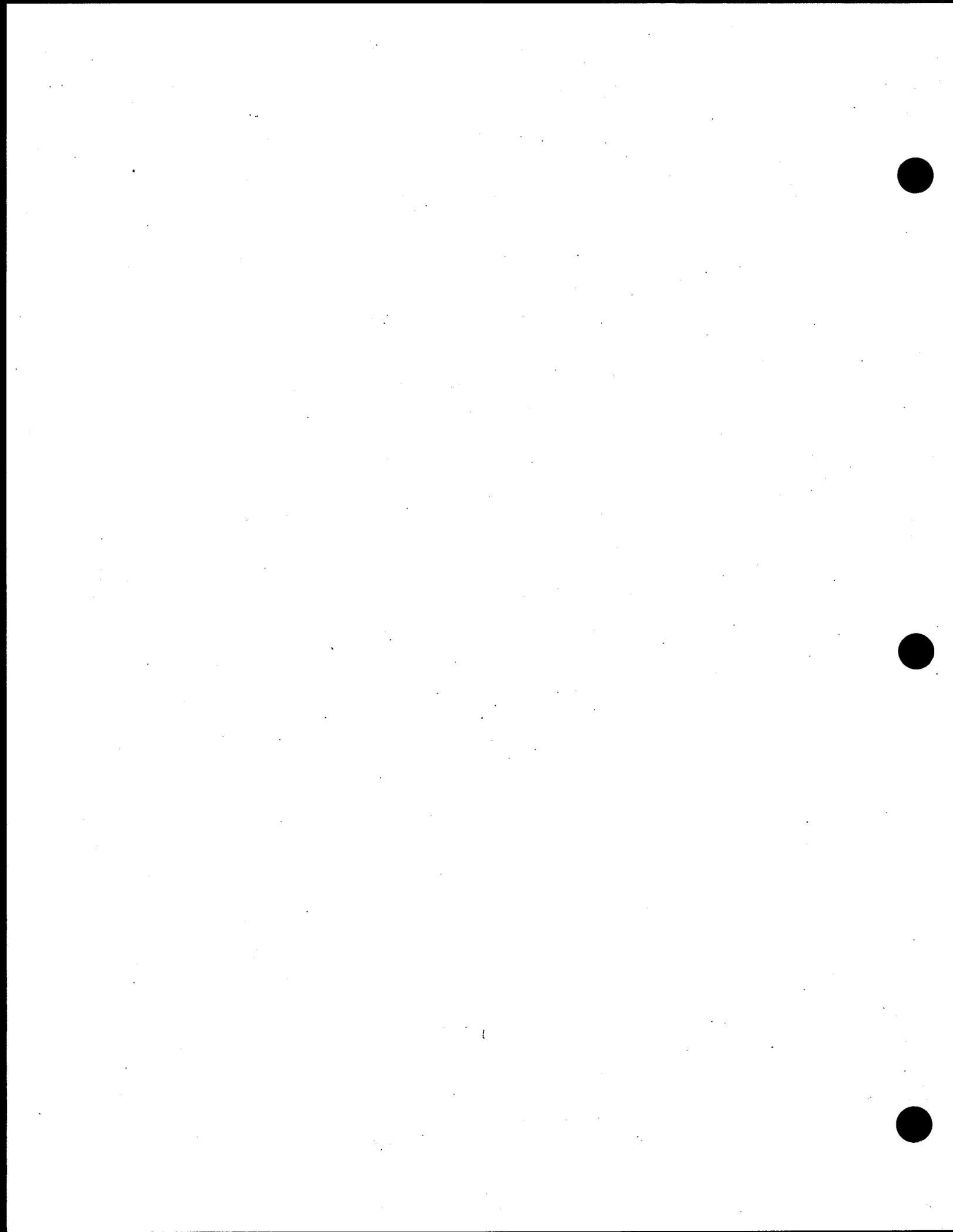


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**PROJECT LABOR AGREEMENT COVERING SPECIFIED  
RENOVATION & REHABILITATION OF NEW YORK CITY OWNED  
FACILITIES & STRUCTURES**

**ARTICLE 1 - PREAMBLE**

WHEREAS, the City of New York desires to provide for the cost efficient, safe, quality, and timely completion of certain rehabilitation and renovation work ("Program Work," as defined in Article 3) for Fiscal Years 2010 - 2014 in a manner designed to afford the lowest costs to the Agencies covered by this Agreement, and the Public it represents, and the advancement of permissible statutory objectives;

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia, by:

(1) providing a mechanism for responding to the unique construction needs associated with this Program Work and achieving the most cost effective means of construction, including direct labor cost savings, by the Building and Construction Trades Council of Greater New York and Vicinity and the signatory Local Unions and their members waiving various shift and other hourly premiums and other work and pay practices which would otherwise apply to Program Work;

(2) expediting the construction process and otherwise minimizing the disruption to the covered Agencies' ongoing operations at the facilities that are the subject of the Agreement;

(3) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes, reducing jobsite friction on common situs worksites, and promoting labor harmony and peace for the duration of the Program Work;

(4) standardizing the terms and conditions governing the employment of labor on the Program Work;

(5) permitting wide flexibility in work scheduling and shift hours and times to allow maximum work to be done during off hours yet at affordable pay rates;

(6) permitting adjustments to work rules and staffing requirements from those which otherwise might obtain;

(7) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;

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- (8) ensuring a reliable source of skilled and experienced labor; and
- (9) securing applicable New York State Labor Law exemptions.

WHEREAS, the Building and Construction Trades Council of Greater New York and Vicinity, its participating affiliated Local Unions and their members, desire to assist the City in meeting these operational needs and objectives as well as to provide for stability, security and work opportunities which are afforded by this Project Labor Agreement; and

WHEREAS, the Parties desire to maximize Program Work safety conditions for both workers and the community in the project area.

NOW, THEREFORE, the Parties enter into this Agreement:

## SECTION 1. PARTIES TO THE AGREEMENT

This is a Project Labor Agreement ("Agreement") entered into by the City of New York, on behalf of itself and the Agencies covered herein, including in their capacity as construction manager of covered projects and/or on behalf of any third party construction manager which may be utilized, and the Building and Construction Trades Council of Greater New York and Vicinity ("Council") (on behalf of itself) and the signatory affiliated Local Union's ("Unions" or "Local Unions"). The Council and each signatory Local Union hereby warrants and represents that it has been duly authorized to enter into this Agreement.

## ARTICLE 2 - GENERAL CONDITIONS

### SECTION 1. DEFINITIONS

Throughout this Agreement, the various Union parties including the Building and Construction Trades Council of Greater New York and Vicinity and its participating affiliated Local Unions, are referred to singularly and collectively as "Union(s)" or "Local Unions"; the term "Contractor(s)" shall include any Construction Manager, General Contractor and all other

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

contractors, and subcontractors of all tiers engaged in Program Work within the scope of this Agreement as defined in Article 3; "Agency" means the following New York City agencies: the Department for the Aging (DFTA), Administration for Children's Services (ACS), Department of Citywide Administrative Services (DCAS), Department of Corrections (DOC), Department of Design and Construction (DDC), Fire Department (FDNY), Department of Homeless Services (DHS), Human Resources Administration (HRA), Department of Health and Mental Hygiene (DOHMH), Department of Parks and Recreation (DPR), Police Department (NYPD); Department of Sanitation (DSNY); the New York City Agency that awards a particular contract subject to this Agreement may be referred to hereafter as the "Agency"; when an Agency acts as Construction Manager, unless otherwise provided, it has the rights and obligations of a "Construction Manager" in addition to the rights and obligations of an Agency; the Building and Construction Trades Council of Greater New York and Vicinity is referred to as the "Council"; and the work covered by this Agreement (as defined in Article 3) is referred to as "Program Work."

**SECTION 2. CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE**

This Agreement shall not become effective unless each of the following conditions are met: the Agreement is executed by (1) the Council, on behalf of itself, (2) the participating affiliated Local Unions; and (3) the mayor of the City of New York or his designee.

**SECTION 3. ENTITIES BOUND & ADMINISTRATION OF AGREEMENT**

This Agreement shall be binding on all participating Unions and their affiliates, the Construction Manager (in its capacity as such) and all Contractors of all tiers performing Program Work, as defined in Article 3. The Contractors shall include in any subcontract that they let for performance during the term of this Agreement a requirement that their subcontractors, of all tiers, become signatory and bound by this Agreement with respect to that subcontracted work

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falling within the scope of Article 3 and all Contractors (including subcontractors) performing Program Work shall be required to sign a "Letter of Assent" in the form annexed hereto as Exhibit "A". This Agreement shall be administered by the applicable Agency or a Construction Manager or such other designee as may be named by the Agency or Construction Manager, on behalf of all Contractors.

**SECTION 4. SUPREMACY CLAUSE**

This Agreement, together with the local Collective Bargaining Agreements appended hereto as Schedule A, represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other collective bargaining agreement of any type which would otherwise apply to this Program Work, in whole or in part, except that Program Work which falls within the jurisdiction of the Operating Engineers Locals 14 and 15 and/or the Teamsters Local 282 will be performed under the terms and conditions set out in the Schedule A agreements of Operating Engineers Locals 14 and 15 and Teamsters Local 282. Subject to the foregoing, where a subject covered by the provisions of this Agreement is also covered by a Schedule A, the provisions of this Agreement shall prevail. It is further understood that no Contractor shall be required to sign any other agreement as a condition of performing Program Work. No practice, understanding or agreement between a Contractor and a Local Union which is not set forth in this Agreement shall be binding on this Program Work unless endorsed in writing by the Construction Manager or such other designee as may be designated by the Agency.

**SECTION 5. LIABILITY**

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The Construction Manager and any Contractor shall not be liable for any violations of this Agreement by any other Contractor; and the Council and

Local Unions shall not be liable for any violations of this Agreement by any other Union.

**SECTION 6. THE AGENCY**

The Agency (or Construction Manager where applicable) shall require in its bid specifications for all Program Work within the scope of Article 3 that all successful bidders, and their subcontractors of all tiers, become bound by, and signatory to, this Agreement. The Agency (or Construction Manager) shall not be liable for any violation of this Agreement by any Contractor. It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of the Agency or Construction Manager in determining which Contractors shall be awarded contracts for Program Work. It is further understood that the Agency or Construction Manager has sole discretion at any time to terminate, delay or suspend the Program Work, in whole or part, on any Program.

**SECTION 7. AVAILABILITY AND APPLICABILITY TO ALL SUCCESSFUL BIDDERS**

The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for (or subcontractor of) Program Work who becomes signatory thereto, without regard to whether that successful bidder (or subcontractor) performs work at other sites on either a union or non-union basis and without regard to whether employees of such successful bidder (or subcontractor) are, or are not, members of any unions. This Agreement shall not apply to the work of any Contractor which is performed at any location other than the site of Program Work.

**SECTION 8. SUBCONTRACTING**

Contractors will subcontract Program Work only to a person, firm or corporation who is or agrees to become party to this Agreement.

**ARTICLE 3-SCOPE OF THE AGREEMENT**

**SECTION 1. WORK COVERED**

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

Program Work shall be limited to designated rehabilitation and renovation construction contracts bid and let by an Agency (or its Construction Manager where applicable) after the effective date of this Agreement with respect to rehabilitation and renovation work performed for an Agency on City-owned property under contracts let prior to June 30, 2014. Subject to the foregoing, and the exclusions below, such Program Work shall mean any and all contracts that predominantly involve the renovation, repair, alteration, rehabilitation or expansion of an existing City-owned building or structure within the five boroughs of New York City. Examples of Program Work include, but are not limited to, the renovation, repair, alteration and rehabilitation of an existing temporary or permanent structure, or an expansion of above ground structures located in the City on a City-owned building. This Program Work shall also include JOCS contracts, demolition work, site work, asbestos and lead abatement, painting services, carpentry services, and carpet removal and installation, to the extent incidental to such building rehabilitation of City-owned buildings or structures.

It is understood that Program Work does not include, and this Project Labor Agreement shall not apply to, any other work, including:

1. Contracts let and work performed in connection with projects carried over, recycled from, or performed under bids or rebids relating to work that were bid prior to the effective date of this Agreement or after June 30, 2014;
2. Contracts procured on an emergency basis;
3. Small purchases (purchases not more than \$100,000) awarded pursuant to New York City Charter §314, New York City Charter § 316 and New York City Procurement Policy Board Rules §3-08;
4. Contracts for work on streets and bridges and for the closing or environmental remediation of landfills;

5. Contracts with not-for-profit corporations where the City is not awarding or performing the work performed for that entity;

6. Contracts with governmental entities where the City is not awarding or performing the work performed for that entity;

7. Contracts with electric utilities, gas utilities, telephone companies, and railroads, except that it is understood and agreed that these entities may only install their work to a demarcation point, e.g. a telephone closet or utility vault, the location of which is determined prior to construction and employees of such entities shall not be used to replace employees performing Program Work pursuant to this agreement; and

8. Contracts for installation of information technology that are not otherwise Program Work.

## SECTION 2. TIME LIMITATIONS

In addition to falling within the scope of Article 3, Section 1, to be covered by this Agreement Program Work must be (1) advertised and let for bid after the effective date of this Agreement, and (2) let for bid prior to June 30, 2014, the expiration date of this Agreement. It is understood that this Agreement, together with all of its provisions, shall remain in effect for all such Program Work until completion, even if not completed by the expiration date of the Agreement. If Program Work otherwise falling within the scope of Article 3, Section 1 is not let for bid by the expiration date of this Agreement, this Agreement may be extended to that work by mutual agreement of the parties.

## SECTION 3. EXCLUDED EMPLOYEES

The following persons are not subject to the provisions of this Agreement, even though performing Program Work:

A. Superintendents, supervisors (excluding general and forepersons

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

specifically covered by a craft's Schedule A), engineers, professional engineers and/or licensed architects engaged in inspection and testing, quality control/assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers, guards, technicians, non-manual employees, and all professional, engineering, administrative and management persons;

B. Employees of the Agency, New York City, or any other municipal or State agency, authority or entity, or employees of any other public employer, even though working on the Program site while covered Program Work is underway;

C. Employees and entities engaged in off-site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of project components, materials, equipment or machinery or involved in deliveries to and from the Program site, except to the extent they are lawfully included in the bargaining unit of a Schedule A agreement;

D. Employees of the Construction Manager (except that in the event the Agency engages a Contractor to serve as Construction Manager, then those employees of the Construction Manager performing manual, on site construction labor will be covered by this Agreement);

E. Employees engaged in on-site equipment warranty work unless employees are already working on the site and are certified to perform warranty work;

F. Employees engaged in geophysical testing other than boring for core samples;

G. Employees engaged in laboratory, specialty testing, or inspections, pursuant to a professional services agreement between the Agency, or any of the Agency's other professional consultants, and such laboratory, testing, inspection or surveying firm; and

H. Employees engaged in on-site maintenance of installed equipment or systems which maintenance is awarded as part of a contract that includes Program Work but

which maintenance occurs after installation of such equipment or system and is not directly related to construction services.

#### **SECTION 4. NON-APPLICATION TO CERTAIN ENTITIES**

This Agreement shall not apply to those parents, affiliates, subsidiaries, or other joint or sole ventures of any Contractor which do not perform Program Work. It is agreed that this Agreement does not have the effect of creating any joint employment, single employer or alter ego status among the Agency (including in its capacity as Construction Manager) or any Contractor. The Agreement shall further not apply to any New York City or other municipal or State agency, authority, or entity other than a listed Agency and nothing contained herein shall be construed to prohibit or restrict the Agency or its employees, or any State, New York City or other municipal or State authority, agency or entity and its employees, from performing on or off-site work related to Program Work.

As the contracts involving Program Work are completed and accepted, the Agreement shall not have further force or effect on such items or areas except where inspections, additions, repairs, modifications, check-out and/or warranty work are assigned in writing (copy to Local Union involved) by the Agency (or Construction Manager) for performance under the terms of this Agreement.

### **ARTICLE 4- UNION RECOGNITION AND EMPLOYMENT**

#### **SECTION 1. PRE-HIRE RECOGNITION**

The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all employees who are performing on-site Program Work, with respect to that work.

#### **SECTION 2. UNION REFERRAL**

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

A. The Contractors agree to employ and hire craft employees for Program Work covered by this Agreement through the job referral systems and hiring halls established in the Local Unions area collective bargaining agreements. Notwithstanding this, Contractors shall have sole right to determine the competency of all referrals; to determine the number of employees required; to select employees for layoff (subject to Article 5, Section 3); and the sole right to reject any applicant referred by a Local Union, subject to the show-up payments. In the event that a Local Union is unable to fill any request for qualified employees within a 48 hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source. In the event that the Local Union does not have a job referral system, the Contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor shall notify the Local Union of craft employees hired for Program Work within its jurisdiction from any source other than referral by the Union.

B. A Contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Program Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and
- (3) were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award.

No more than twelve per centum (12%) of the employees covered by this Agreement, per Contractor by craft, shall be hired through the special provisions above. Under this provision, name referrals begin with the eighth employee needed and continue on that same

basis.

C. Notwithstanding Section 2(B), above, certified MWBE contractors for which participation goals are set pursuant to New York City Administrative Code §6-129, that are not signatory to any Schedule A CBAs, with contracts valued at or under five hundred thousand (\$500,000), may request by name, and the Local will honor, referral of the second (2<sup>nd</sup>), fourth (4<sup>th</sup>), sixth (6<sup>th</sup>), and eighth (8<sup>th</sup>) employee, who have applied to the Local for Program Work and who meet the following qualifications:

- (1) possess any license required by New York State law for the Program Work to be performed;
- (2) have worked a total of at least 1000 hours in the Construction field during the prior 3 years; and
- (3) were on the Contractor's active payroll for at least 60 out of the 180 work days prior to the contract award.

For such contracts valued at above \$500,000 but less than \$1 million, the Local will honor referrals by name of the second (2<sup>nd</sup>), fifth (5<sup>th</sup>), and eighth (8<sup>th</sup>) employee subject to the foregoing requirements. In both cases, name referrals will thereafter be in accordance with Section 2(B), above.

D. Where a certified MWBE Contractor voluntarily enters into a Collective Bargaining Agreement ("CBA") with a BCTC Union, the employees of such Contractor at the time the CBA is executed shall be allowed to join the Union for the applicable trade subject to satisfying the Union's basic standards of proficiency for admission.

### SECTION 3. NON-DISCRIMINATION IN REFERRALS

The Council represents that each Local Union hiring hall and referral system will be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations which require equal employment opportunities. Referrals

shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements and shall be subject to such other conditions as are established in this Article. No employment applicant shall be discriminated against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

#### **SECTION 4: MINORITY AND FEMALE REFERRALS**

In the event a Local Union either fails, or is unable to refer qualified minority or female applicants in percentages equaling the workforce participation goals adopted by the City and set forth in the Agency's (or, if applicable, Construction Manager's) bid specifications, within 48 hours of the request for same, the Contractor may employ qualified minority or female applicants from any other available source.

#### **SECTION 5. CROSS AND QUALIFIED REFERRALS**

The Local Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor.

#### **SECTION 6. UNION DUES**

All employees covered by this Agreement shall be subject to the union security provisions contained in the applicable Schedule A local agreements, as amended from time to time, but only for the period of time during which they are performing on-site Program Work and only to the extent of tendering payment of the applicable union dues and assessments uniformly required for union membership in the Local Unions which represent the craft in which the employee is performing Program Work. No employee shall be discriminated against at any Program Work site because of the employee's union membership or lack thereof. In the case of

unaffiliated employees, the dues payment will be received by the Local Unions as an agency shop fee.

## **SECTION 7. CRAFT FOREPERSONS AND GENERAL FOREPERSONS**

The selection of craft forepersons and/or general forepersons and the number of forepersons required shall be solely the responsibility of the Contractor except where otherwise provided by specific provisions of an applicable Schedule A, and provided that all craft forepersons shall be experienced and qualified journeypersons in their trade as determined by the appropriate Local Union. All forepersons shall take orders exclusively from the designated Contractor representatives. Craft forepersons shall be designated as working forepersons at the request of the Contractor, except when an existing local Collective Bargaining Agreement prohibits a foreperson from working when the craft persons he is leading exceed a specified number.

## **ARTICLE 5- UNION REPRESENTATION**

### **SECTION 1. LOCAL UNION REPRESENTATIVE**

Each Local Union representing on-site employees shall be entitled to designate in writing (copy to Contractor involved and Construction Manager) one representative, and/or the Business Manager, who shall be afforded access to the Program Work site.

### **SECTION 2. STEWARDS**

A. Each Local Union shall have the right to designate a working journey person as a Steward and an alternate, and shall notify the Contractor and Construction Manager of the identity of the designated Steward (and alternate) prior to the assumption of such duties. Stewards shall not exercise supervisory functions and will receive the regular rate of pay for their craft classifications. All Stewards shall be working Stewards.

B. In addition to their work as an employee, the Steward shall have the right

to receive complaints or grievances and to discuss and assist in their adjustment with the Contractor's appropriate supervisor. Each Steward shall be concerned with the employees of the Steward's trade and, if applicable, subcontractors of their Contractor, but not with the employees of any other trade Contractor. No Contractor shall discriminate against the Steward in the proper performance of Union duties.

C. The Stewards shall not have the right to determine when overtime shall be worked, or who shall work overtime except pursuant to a Schedule A provision providing procedures for the equitable distribution of overtime.

### **SECTION 3. LAYOFF OF A STEWARD**

Contractors agree to notify the appropriate Union 24 hours prior to the layoff of a Steward, except in cases of discipline or discharge for just cause. If a Steward is protected against layoff by a Schedule A provision, such provision shall be recognized to the extent the Steward possesses the necessary qualifications to perform the work required. In any case in which a Steward is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor.

## **ARTICLE 6- MANAGEMENT'S RIGHTS**

### **SECTION 1. RESERVATION OF RIGHTS**

Except as expressly limited by a specific provision of this Agreement, Contractors retain full and exclusive authority for the management of their operations including, but not limited to, the right to: direct the work force, including determination as to the number of employees to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; require compliance with the directives of the Agency including standard restrictions related to security and access to the site that are equally applicable to Agency employees, guests,

or vendors; or the discipline or discharge for just cause of its employees; assign and schedule work; promulgate reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work; and, the requirement, timing and number of employees to be utilized for overtime work. No rules, customs, or practices which limit or restrict productivity or efficiency of the individual, as determined by the Contractor, Agency and/or Construction Manager and/or joint working efforts with other employees shall be permitted or observed.

## SECTION 2. MATERIALS, METHODS & EQUIPMENT

There shall be no limitation or restriction upon the Contractors' choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source; provided, however, that where there is a Schedule "A" that includes a lawful union standards and practices clause, then such clause as set forth in Schedule A Agreements will be complied with, unless there is a lawful Agency specification (or specification issued by a Construction Manager which would be lawful if issued by the Agency directly) that would specifically limit or restrict the Contractor's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials or products, tools, or other labor-saving devices, and which would prevent compliance with such Schedule A clause. The on-site installation or application of such items shall be performed by the craft having jurisdiction over such work; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in

the installation, check-off or testing of specialized or unusual equipment or facilities as designated by the Contractor. There shall be no restrictions as to work which is performed off-site for Program Work.

## **ARTICLE 7- WORK STOPPAGES AND LOCKOUTS**

### **SECTION 1. NO STRIKES-NO LOCK OUT**

There shall be no strikes, sympathy strikes, picketing, work stoppages, slowdowns, hand billing, demonstrations or other disruptive activity at the Program Work site for any reason by any Union or employee against any Contractor or employer. There shall be no other Union, or concerted or employee activity which disrupts or interferes with the operation of the Program Work or the objectives of the Agency at any Program Work site. In addition, failure of any Union or employee to cross any picket line established by any Union, signatory or non-signatory to this Agreement, or the picket or demonstration line of any other organization, at or in proximity to a Program Work site where the failure to cross disrupts or interferes with the operation of Program Work is a violation of this Article. Should any employees breach this provision, the Unions will use their best efforts to try to immediately end that breach and return all employees to work. There shall be no lockout at a Program Work site by any signatory Contractor, Agency or Construction Manager.

### **SECTION 2. DISCHARGE FOR VIOLATION**

A Contractor may discharge any employee violating Section 1, above, and any such employee will not be eligible thereafter for referral under this Agreement for a period of 100 days.

### **SECTION 3. NOTIFICATION**

If a Contractor contends that any Union has violated this Article, it will notify the

Local Union involved advising of such fact, with copies of the notification to the Council. The Local Union shall instruct and order, the Council shall request, and each shall otherwise use their best efforts to cause, the employees (and where necessary the Council shall use its best efforts to cause the Local Union), to immediately cease and desist from any violation of this Article. If the Council complies with these obligations it shall not be liable for the unauthorized acts of a Local Union or its members. Similarly, a Local Union and its members will not be liable for any unauthorized acts of the Council. Failure of a Contractor or the Construction Manager to give any notification set forth in this Article shall not excuse any violation of Section 1 of this Article.

#### SECTION 4. EXPEDITED ARBITRATION

Any Contractor or Union alleging a violation of Section 1 of this Article may utilize the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity) that may be brought.

A. A party invoking this procedure shall notify J.J. Pierson or Richard Adelman; who shall alternate (beginning with Arbitrator J.J. Pierson) as Arbitrator under this expedited arbitration procedure. If the Arbitrator next on the list is not available to hear the matter within 24 hours of notice, the next Arbitrator on the list shall be called. Copies of such notification will be simultaneously sent to the alleged violator and Council.

B. The Arbitrator shall thereupon, after notice as to time and place to the Contractor, the Local Union involved, the Council and the Construction Manager, hold a hearing within 48 hours of receipt of the notice invoking the procedure if it is contended that the violation still exists. The hearing will not, however, be scheduled for less than 24 hours after the notice required by Section 3, above.

C. All notices pursuant to this Article may be provided by telephone, telegraph, hand delivery, or fax, confirmed by overnight delivery, to the Arbitrator, Contractor,

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Construction Manager and Local Union involved. The hearing may be held on any day including Saturdays or Sundays. The hearing shall be completed in one session, which shall not exceed 8 hours duration (no more than 4 hours being allowed to either side to present their case, and conduct their cross examination) unless otherwise agreed. A failure of any Union or Contractor to attend the hearing shall not delay the hearing of evidence by those present or the issuance of an award by the Arbitrator.

D. The sole issue at the hearing shall be whether a violation of Section 1, above, occurred. If a violation is found to have occurred, the Arbitrator shall issue a Cease and Desist Award restraining such violation and serve copies on the Contractor and Union involved. The Arbitrator shall have no authority to consider any matter in justification, explanation or mitigation of such violation or to award damages (any damages issue is reserved solely for court proceedings, if any.) The Award shall be issued in writing within 3 hours after the close of the hearing, and may be issued without an Opinion. If any involved party desires an Opinion, one shall be issued within 15 calendar days, but its issuance shall not delay compliance with, or enforcement of, the Award.

E. The Agency and Construction Manager (or such other designee of the Agency) may participate in full in all proceedings under this Article.

F. An Award issued under this procedure may be enforced by any court of competent jurisdiction upon the filing of this Agreement together with the Award. Notice of the filing of such enforcement proceedings shall be given to the Union or Contractor involved, and the Construction Manager.

G. Any rights created by statute or law governing arbitration proceedings which are inconsistent with the procedure set forth in this Article, or which interfere with compliance thereto, are hereby waived by the Contractors and Unions to whom they accrue.

H. The fees and expenses of the Arbitrator shall be equally divided between the involved Contractor and Union.

#### **SECTION 5. ARBITRATION OF DISCHARGES FOR VIOLATION**

Procedures contained in Article 9 shall not be applicable to any alleged violation of this Article, with the single exception that an employee discharged for violation of Section 1, above, may have recourse to the procedures of Article 9 to determine only if the employee did, in fact, violate the provisions of Section 1 of this Article; but not for the purpose of modifying the discipline imposed where a violation is found to have occurred.

#### **ARTICLE 8 - LABOR MANAGEMENT COMMITTEE**

##### **SECTION 1. SUBJECTS**

The Program Labor Management Committee will meet on a regular basis to: 1) promote harmonious relations among the Contractors and Unions; 2) enhance safety awareness, cost effectiveness and productivity of construction operations; 3) protect the public interests; 4) discuss matters relating to staffing and scheduling with safety and productivity as considerations; and 5) review efforts to meet applicable participation goals for MWBEs and workforce participation goals for minority and female employees.

##### **SECTION 2. COMPOSITION**

The Committee shall be jointly chaired by a designee of the Agency and the President of the Council. It may include representatives of the Local Unions and Contractors involved in the issues being discussed. The parties may mutually designate an MWBE representative to participate in appropriate Committee discussions. The Committee may conduct business through mutually agreed upon sub-committees.

#### **ARTICLE 9- GRIEVANCE & ARBITRATION PROCEDURE**

**SECTION 1. PROCEDURE FOR RESOLUTION OF GRIEVANCES**

Any question, dispute or claim arising out of, or involving the interpretation or application of this Agreement (other than jurisdictional disputes or alleged violations of Article 7, Section 1) shall be considered a grievance and shall be resolved pursuant to the exclusive procedure of the steps described below, provided, in all cases, that the question, dispute or claim arose during the term of this Agreement.

**Step 1:**

(a) When any employee covered by this Agreement feels aggrieved by a claimed violation of this Agreement, the employee shall, through the Local Union business representative or job steward give notice of the claimed violation to the work site representative of the involved Contractor and the Construction Manager. To be timely, such notice of the grievance must be given within 7 calendar days after the act, occurrence or event giving rise to the grievance. The business representative of the Local Union or the job steward and the work site representative of the involved Contractor shall meet and endeavor to adjust the matter within 7 calendar days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving party, may, within 7 calendar days thereafter, pursue Step 2 of the grievance procedure by serving the involved Contractor with written copies of the grievance setting forth a description of the claimed violation, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 are non-precedential except as to the specific Local Union, employee and Contractor directly involved unless the settlement is accepted in writing by the Construction Manager (or designee) as creating a precedent.

(b) Should any signatory to this Agreement have a dispute (excepting jurisdictional disputes or alleged violations of Article 7, Section 1) with any other signatory to

this Agreement and, if after conferring, a settlement is not reached within 7 calendar days, the dispute shall be reduced to writing and proceed to Step 2 in the same manner as outlined in subparagraph (a) for the adjustment of employee grievances.

**Step 2:**

The Business Manager or designee of the involved Local Union, together with representatives of the involved Contractor, Council and the Construction Manager (or designee), shall meet in Step 2 within 7 calendar days of service of the written grievance to arrive at a satisfactory settlement.

**Step 3:**

(a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants, including the Construction Manager or designee) to J.J. Pierson or Richard Adelman, who shall act, alternately (beginning with Arbitrator J.J. Pierson), as the Arbitrator under this procedure. The Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be parties. The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor and Local Union.

(b) Failure of the grieving party to adhere to the time limits set forth in this Article shall render the grievance null and void. These time limits may be extended only by written consent of the Construction Manager (or designee), involved Contractor and involved Local Union at the particular step where the extension is agreed upon. The Arbitrator shall have authority to make decisions only on the issues presented to him and shall not have the authority to change, add to, delete or modify any provision of this Agreement.

**SECTION 2. LIMITATION AS TO RETROACTIVITY**

No arbitration decision or award may provide retroactivity of any kind exceeding 60 calendar days prior to the date of service of the written grievance on the Construction Manager and the involved Contractor or Local Union.

**SECTION 3. PARTICIPATION BY AGENCY AND/OR CONSTRUCTION MANAGER**

The Agency and Construction Manager (or such other designee of the Agency) shall be notified by the involved Contractor of all actions at Steps 2 and 3 and, at its election, may participate in full in all proceedings at these Steps, including Step 3 arbitration.

**ARTICLE 10 - JURISDICTIONAL DISPUTES**

**SECTION 1. NO DISRUPTIONS**

There will be no strikes, sympathy strikes, work stoppages, slowdowns, picketing or other disruptive activity of any kind arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted and as assigned by the Contractor. No jurisdictional dispute shall excuse a violation of Article 7.

**SECTION 2. ASSIGNMENT**

All Program Work assignments shall be made by the Contractor to unions affiliated with the BCTC consistent with the New York Plan for the Settlement of Jurisdictional Disputes ("New York Plan") and its Greenbook decisions, if any. Where there are no applicable Greenbook decisions, assignments shall be made in accordance with the provisions of the New York Plan and local industry practice.

**SECTION 3. NO INTERFERENCE WITH WORK**

There shall be no interference or interruption of any kind with the Program Work while any jurisdictional dispute is being resolved. The work shall proceed as assigned by the

Contractor until finally resolved under the applicable procedure of this Article. The award shall be confirmed in writing to the involved parties. There shall be no strike, work stoppage or interruption in protest of any such award.

## **ARTICLE 11 - WAGES AND BENEFITS**

### **SECTION 1. CLASSIFICATION AND BASE HOURLY RATE**

All employees covered by this Agreement shall be classified in accordance with the work performed and paid the hourly wage rates applicable for those classifications as required by the applicable prevailing wage laws.

### **SECTION 2. EMPLOYEE BENEFITS**

A. The Contractors agree to pay on a timely basis contributions on behalf of all employees covered by this Agreement to those established jointly trustee employee benefit funds designated in Schedule A (in the appropriate Schedule A amounts), provided that such benefits are required to be paid on public works under any applicable prevailing wage law. Bona fide jointly trustee fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added if similarly required under applicable prevailing wage law. Contractors, not otherwise contractually bound to do so, shall not be required to contribute to benefits, trusts or plans of any kind which are not required by the prevailing wage law provided, however, that this provision does not relieve Contractors signatory to local collective bargaining agreement with any affiliated union from complying with the fringe benefit requirements for all funds contained in the CBA.

B. The Contractors agree to be bound by the written terms of the legally established jointly trustee Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such Trust Funds but only with regard to Program Work done under this Agreement and only for those employees to whom this Agreement

requires such benefit payments.

C. To the extent consistent with New York City's Procurement Policy Board Rules with respect to prompt payment, as published at [www.nyc.gov/ppb](http://www.nyc.gov/ppb), §4-06(e), and in consideration of the unions' waiver of their rights to withhold labor from a contractor or subcontractor delinquent in the payment of fringe benefits contributions ("Delinquent Contractor"); the Agency agrees that where any such union and/or fringe benefit fund shall notify the Agency, the General Contractor, and the Delinquent Contractor in writing with back-up documentation that the Delinquent Contractor has failed to make fringe benefit contributions to it as provided herein and the Delinquent Contractor shall fail, within ten (10) calendar days after receipt of such notice, to furnish either proof of such payment or notice that the amount claimed by the union and/or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor which the union or fringe benefit fund claims to be due it, and shall remit the amount when and so withheld to the fringe benefit fund and deduct such payment from the amounts then otherwise due and payable to the General Contractor, which payment shall, as between the General Contractor and the Agency, be deemed a payment by the Agency to the General Contractor; provided however, that in any month, such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. The union or its employee benefit funds shall include in its notification of delinquent payment of fringe benefits only such amount it asserts the Delinquent Contractor failed to pay on the specific project against which the claim is made and the union or its employee benefit funds may not include in such notification any amount such Delinquent Contractor may have failed to pay on any other City or non-City project.

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D. In the event the General Contractor or Delinquent Contractor shall notify the Agency as above provided that the claim of the union or fringe benefit fund is in dispute, the Agency shall withhold from amounts then or thereafter becoming due and payable to the General Contractor an amount equal to that portion of such payment due to the General Contractor that relates solely to the work performed by the Delinquent Contractor which the union and/or fringe benefit fund claims to be due it, and deposit such amount when and so withheld in a separate interest-bearing account pending resolution of the dispute pursuant to the union's Schedule A agreement, and the amount so deposited together with the interest thereon shall be paid to the party or parties ultimately determined to be entitled thereto, or held until the Delinquent Contractor and union or fringe benefit fund shall otherwise agree as to the disposition thereof; provided however, that such withholding shall not exceed the amount contained in the General Contractor's monthly invoice for work performed by the Delinquent Contractor. In the event the Agency shall be required to withhold amounts from a General Contractor for the benefit of more than one fringe benefit fund, the amounts so withheld in the manner and amount prescribed above shall be applied to or for such fund in the order in which the written notices of nonpayment have been received by the Agency, and if more than one such notice was received on the same day, proportionately based upon the amount of the union and/or fringe benefit fund claims received on such day. Nothing herein contained shall prevent the Agency from commencing an interpleader action to determine entitlement to a disputed payment in accordance with section one thousand six of the civil practice law and rules or any successor provision thereto.

E. Payment to a fringe benefit fund under this provision shall not relieve the General Contractor or Delinquent Contractor from responsibility for the work covered by the payment. Except as otherwise provided, nothing contained herein shall create any obligation on

the part of the Agency to pay any union or fringe benefit fund, nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the union/fund and/or fringe benefit and the Agency.

**ARTICLE 12- HOURS OF WORK, PREMIUM PAYMENTS,  
SHIFTS AND HOLIDAYS**

**SECTION 1. WORK WEEK AND WORK DAY**

A. The standard work week shall consist of 40 hours of work at straight time rates, Monday through Friday, 8 hours per day, plus ½ hour unpaid lunch period.

B. In accordance with Program needs, there shall be flexible start times with advance notice from Contractor to the Union. The Day Shift shall commence between the hours of 6:00 a.m. and 9:00 a.m. and shall end between the hours of 2:30 p.m. and 5:30 p.m., for an 8 hour day, and up to 7:30 p.m. for a 10 hour day. The Evening Shift shall commence between the hours of 3:00 p.m. and 6:00 p.m., unless different times are necessitated by the Agency's phasing plans on specific projects. The Night Shift shall commence between the hours of 11:00 p.m. and 2:00 a.m., unless different times are necessitated by the Agency's phasing plans on specific projects. Subject to the foregoing, starting and quitting times shall occur at the Program Work site designated by the Contractor.

C. Scheduling - Monday through Friday is the standard work week; 8 hours of work plus ½ hour unpaid lunch. Notwithstanding any other provision of this Agreement, a contractor may schedule a four day work week, 10 hours per day at straight time rates, plus a ½ hour unpaid lunch, at the commencement of the job.

D. Notice - Contractors shall provide not less than 5 days prior notice to the Local Union involved as to the work week and work hour schedules to be worked or such lesser notice as may be mutually agreed upon.

## SECTION 2. OVERTIME

Overtime shall be paid for any work over eight (8) hours in a day where 5/8s is scheduled or for work over ten (10) hours in a day where 4/10s is scheduled and over forty (40) hours in a week, at time and one half (1½) Monday through Saturday. All overtime work performed on Sunday and Holidays will be paid pursuant to the applicable Schedule A. There shall be no stacking or pyramiding of overtime pay under any circumstances. There will be no restriction upon the Contractor's scheduling of overtime or the nondiscriminatory designation of employees who shall be worked, including the use of employees, other than those who have worked the regular or scheduled work week, at straight time rates. The Contractor shall have the right to schedule work so as to minimize overtime or schedule overtime as to some, but not all, of the crafts and whether or not of a continuous nature.

## SECTION 3. SHIFTS

A. Flexible Schedules - Scheduling of shift work, including Saturday and Sunday work, shall be within the discretion of the Contractor in order to meet Program Work schedules and existing Program Work conditions including the minimization of interference with the mission of the Agency. It is not necessary to work a day shift in order to schedule a second or third shift, or a second shift in order to schedule a third shift, or to schedule all of the crafts when only certain crafts or employees are needed. Shifts must have prior approval of the Agency or Construction Manager, and must be scheduled with not less than five work days notice to the Local Union or such lesser notice as may be mutually agreed upon.

B. Second and/or Third Shifts/Saturday and/or Sunday Work - - The second shift shall start between 3 p.m. and 6 p.m. and the third shift shall start between 11 p.m. and 2 a.m., subject to different times necessitated by the Agency phasing plans on specific projects. There shall be no reduction in shift hour work. With respect to second and third shift work there

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shall be a 5% shift premium. No other premium or other payments for such work shall be required unless such work is in excess of 40 hours in the week. All employees within a classification performing Program Work will be paid at the same wage rate regardless of the shift or work scheduled work, subject only to the foregoing provisions.

C. Flexible Starting Times - Shift starting times will be adjusted by the Contractor as necessary to fulfill Program Work requirements subject to the notice requirements of paragraph A.

**SECTION 4. HOLIDAYS**

A. Schedule - There shall be 8 recognized holidays on the Project:

New Years Day	Labor Day
Martin Luther King Day	President's Day
Memorial Day	Thanksgiving Day
Independence Day	Christmas Day

All said holidays shall be observed on the calendar date except those holidays which occur on Saturday shall be observed on the previous Friday and those that occur on Sunday shall be observed on the following Monday.

B. Payment - Regular holiday pay, if any, for work performed on such a recognized holiday shall be in accordance with the applicable Schedule A.

C. Exclusivity - No holidays other than those listed in Section 4(A) above shall be recognized or observed.

**SECTION 5. SATURDAY MAKE-UP DAYS**

When severe weather, power failure, fire or natural disaster or other similar circumstances beyond the control of the Contractor prevent work from being performed on a regularly scheduled weekday, the Contractor may schedule a Saturday make-up day and such

time shall be scheduled and paid as if performed on a weekday. Any other Saturday work shall be paid at time and one-half (1½). The Contractor shall notify the Local Union on the missed day or as soon thereafter as practicable if such a make-up day is to be worked.

### SECTION 6. REPORTING PAY

A. Employees who report to the work location pursuant to their regular schedule and who are not provided with work shall be paid two hours reporting pay at straight time rates. An employee whose work is terminated early by a Contractor due to severe weather, power failure, fire or natural disaster or for similar circumstances beyond the Contractor's control, shall receive pay only for such time as is actually worked. In other instances in which an employee's work is terminated early (unless provided otherwise elsewhere in this Agreement), the employee shall be paid for his full shift.

B. When an employee, who has completed their scheduled shift and left the Program Work site, is "called out" to perform special work of a casual, incidental or irregular nature, the employee shall receive overtime pay at the rate of time and one-half of the employee's straight time rate for hours actually worked.

C. When an employee leaves the job or work location of their own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Section 7 below, they shall be paid only for the actual time worked.

D. Except as specifically set forth in this Article there shall be no premiums, bonuses, hazardous duty, high time or other special premium payments or reduction in shift hours of any kind.

E. There shall be no pay for time not actually worked except as specifically set forth in this Article and except where an applicable Schedule A requires a full weeks' pay for forepersons.

**SECTION 7. PAYMENT OF WAGES**

A. Termination- Employees who are laid off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractor shall also provide the employee with a written statement setting forth the date of lay off or discharge.

**SECTION 8. EMERGENCY WORK SUSPENSION**

A Contractor may, if considered necessary for the protection of life and/or safety of employees or others, suspend all or a portion of Program Work. In such instances, employees will be paid for actual time worked, except that when a Contractor requests that employees remain at the job site available for work, employees will be paid for that time at their hourly rate of pay.

**SECTION 9. INJURY/DISABILITY**

An employee who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than 8 hours wages for that day. Further, the employee shall be rehired at such time as able to return to duties provided there is still Program Work available for which the employee is qualified and able to perform.

**SECTION 10. TIME KEEPING**

A Contractor may utilize brassing or other systems to check employees in and out. Each employee must check in and out. The Contractor will provide adequate facilities for checking in and out in an expeditious manner.

**SECTION 11. MEAL PERIOD**

A Contractor shall schedule an unpaid period of not more than 1/2 hour duration at the work location between the 3rd and 5th hour of the scheduled shift. A Contractor may, for efficiency of operation, establish a schedule which coordinates the meal periods of two or more crafts or which provides for staggered lunch periods within a craft or trade. If an employee is

required to work through the meal period, the employee shall be compensated in a manner established in the applicable Schedule A.

## **SECTION 12. BREAK PERIODS**

There will be no rest periods, organized coffee breaks or other non-working time established during working hours. Individual coffee containers will be permitted at the employee's work location. Where 4/10s are being worked there shall be a morning and an afternoon coffee break.

## **ARTICLE 13 - APPRENTICES**

### **SECTION 1. RATIOS**

Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities, women and economically disadvantaged non-minority males, Contractors will employ apprentices in their respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured. Contractors may utilize apprentices and such other appropriate classifications in the maximum ratio permitted by the New York State Department of Labor or the maximum allowed per trade. Apprentices and such other classifications as are appropriate shall be employed in a manner consistent with the provisions of the appropriate Schedule A. The parties encourage, as an appropriate source of apprentice recruitment consistent with the rules and operations of the affiliated unions' apprentice-programs, the use of the Edward J. Malloy Initiative for Construction Skills, Non-Traditional Employment for Women and Helmets to Hardhats.

## **ARTICLE 14-SAFETY PROTECTION OF PERSON AND PROPERTY**

### **SECTION 1. SAFETY REQUIREMENTS**

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Each Contractor will ensure that applicable OSHA and safety requirements are at all times maintained on the Program Work site and the employees and Unions agree to cooperate fully with these efforts to the extent consistent with their rights and obligations under the law. Employees will cooperate with employer safety policies and will perform their work at all times in a safe manner and protect themselves and the property of the Contractor and Agency from injury or harm, to the extent consistent with their rights and obligations under the law. Failure to do so will be grounds for discipline, including discharge.

**SECTION 2. CONTRACTOR RULES**

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the Contractors and the Construction Manager for this Program Work. Such rules will be published and posted in conspicuous places throughout the Program Work sites. Any site security and access policies established by the Construction Manager or General Contractor intended for specific application to the construction workforce for Program Work and that are not established pursuant to an Agency directive shall be implemented only after notice to the BCTC and its affiliates and an opportunity for negotiation and resolution by the Labor Management Committee.

**SECTION 3. INSPECTIONS**

The Contractors and Construction Manager retain the right to inspect incoming shipments of equipment, apparatus, machinery and construction materials of every kind.

**ARTICLE 15 - TEMPORARY SERVICES**

Temporary services, i.e. all temporary heat, water, power and light, shall only be required upon the specific request of the Agency or Construction Manager, and when so requested shall be assigned to the appropriate trade claiming jurisdiction. Temporary system coverage shall be provided by the appropriate Contractors' existing employees during working hours in which a

shift is scheduled for employees of this Contractor. The Agency or Construction Manager may determine the need for temporary system coverage requirements during non-working hours. There shall be no stacking of trades on temporary services. In the event a temporary system is claimed by multiple trades, the matter shall be resolved through the New York Plan for Jurisdictional Disputes.

## **ARTICLE 16 - NO DISCRIMINATION**

### **SECTION 1. COOPERATIVE EFFORTS**

The Contractors and Unions agree that they will not discriminate against any employee or applicant for employment because of creed, race, color, religion, sex, sexual orientation, national origin, marital status, citizenship status, disability, age or any other status provided by law, in any manner prohibited by law or regulation.

### **SECTION 2. LANGUAGE OF AGREEMENT**

The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

## **ARTICLE 17- GENERAL TERMS**

### **SECTION 1. PROJECT RULES**

A. The Construction Manager and the Contractors shall establish such reasonable Program Work rules that are not inconsistent with this Agreement or rules common in the industry and are reasonably related to the nature of work. These rules will be explained at the pre-job conference and posted at the Program Work sites and may be amended thereafter as necessary. Notice of amendments will be provided to the appropriate Local Union. Failure of an employee to observe these rules and regulations shall be grounds for discipline, including discharge. The fact that no order was posted prohibiting a certain type of misconduct shall not be a defense to an employee disciplined or discharged for such misconduct when the action taken is

for cause.

B. The parties adopt and incorporate the BCTC's Standards of Excellence as annexed hereto as Exhibit "B".

### **SECTION 2. TOOLS OF THE TRADE**

The welding/cutting torch and chain fall are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction.

### **SECTION 3. SUPERVISION**

Employees shall work under the supervision of the craft foreperson or general foreperson.

### **SECTION 4. TRAVEL ALLOWANCES**

There shall be no payments for travel expenses, travel time, subsistence allowance or other such reimbursements or special pay except as expressly set forth in this Agreement.

### **SECTION 5. FULL WORK DAY**

Employees shall be at their work area at the starting time established by the Contractor, provided they are provided access to the work area. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

### **SECTION 6. COOPERATION AND WAIVER**

The Construction Manager, Contractors and the Unions will cooperate in seeking any NYS Department of Labor, or any other government, approvals that may be needed for implementation of any terms of this Agreement. In addition, the Council, on their own behalf and

on behalf of its participating affiliated Local Unions and their individual members, intend the provisions of this Agreement to control to the greatest extent permitted by law, notwithstanding contrary provisions of any applicable prevailing wage, or other, law and intend this Agreement to constitute a waiver of any such prevailing wage, or other, law to the greatest extent permissible only for work within the scope of this Agreement, including specifically, but not limited to those provisions relating to shift, night, and similar differentials and premiums. This Agreement does not, however, constitute a waiver or modification of the prevailing wage schedules applicable to work not covered by this Agreement.

#### **ARTICLE 18. SAVINGS AND SEPARABILITY**

##### **SECTION 1. THIS AGREEMENT**

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or if such application may cause the loss of Program funding or any New York State Labor Law exemption for all or any part of the Program Work, the provision or provisions involved (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the remainder of the Agreement shall remain in full force and effect to the extent allowed by law (and to the extent no funding or exemption is lost), unless the part or parts so found to be in violation of law or to cause such loss are wholly inseparable from the remaining portions of the Agreement and/or are material to the purposes of the Agreement. In the event a court of competent jurisdiction finds any portion of the Agreement to trigger the foregoing, the parties will immediately enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the court determination and the intent of the parties hereto for contracts to be let in the future.

## SECTION 2. THE BID SPECIFICATIONS

In the event that the Agency's (or Construction Manager's) bid specifications, or other action, requiring that a successful bidder (and subcontractor) become signatory to this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, or may cause the loss of Program funding or any New York State Labor Law exemption for all or any part of the Program Work, such requirement (and/or its application to particular Program Work, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the Agreement shall remain in full force and effect to the extent allowed by law and to the extent no funding or exemption is lost). In such event, the Agreement shall remain in effect for contracts already bid and awarded or in construction only where the Agency and Contractor voluntarily accepts the Agreement. The parties will enter into negotiations as to modifications to the Agreement to reflect the court or other action taken and the intent of the parties for contracts to be let in the future.

## SECTION 3. NON-LIABILITY

In the event of an occurrence referenced in Section 1 or Section 2 of this Article, neither the Agency, the Construction Manager, any Contractor, nor any Union shall be liable, directly or indirectly, for any action taken, or not taken, to comply with any court order or injunction, other determination, or in order to maintain funding or a New York State Labor Law exemption for Program Work. Bid specifications will be issued in conformance with court orders then in effect and no retroactive payments or other action will be required if the original court determination is ultimately reversed.

## SECTION 4. NON-WAIVER

Nothing in this Article shall be construed as waiving the prohibitions of Article 7 as to signatory Contractors and signatory Unions.

**ARTICLE 19 - FUTURE CHANGES IN SCHEDULE A AREA CONTRACTS**

**SECTION 1. CHANGES TO AREA CONTRACTS**

A. Schedule A to this Agreement shall continue in full force and effect until the Contractor and/or Union parties to the Area Collective Bargaining Agreements which are the basis for Schedule A notify the Agency and Construction Manager in writing of the hourly rate changes agreed to in that Area Collective Bargaining which are applicable to work covered by this Agreement and their effective dates.

B. It is agreed that any provisions negotiated into Schedule A collective bargaining agreements will not apply to work under this Agreement if such provisions are less favorable to those uniformly required of contractors for construction work normally covered by those agreements; nor shall any provision be recognized or applied on Program Work if it may be construed to apply exclusively, or predominantly, to work covered by this Agreement.

C. Any disagreement between signatories to this Agreement over the incorporation into Schedule A of provisions agreed upon in the renegotiation of Area Collective Bargaining Agreements shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

**SECTION 2. LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS**

The Unions agree that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Program Work by any Local Union involved in the renegotiation of Area Local Collective Bargaining Agreements nor shall there be any lock-out on such Program Work affecting a Local Union during the course of such renegotiations.

**ARTICLE 20 - WORKERS' COMPENSATION ADR**

**SECTION 1.**

An ADR program may be negotiated and participation in the ADR Program will be optional by trade.

## **ARTICLE 21 - HELMETS TO HARDHATS**

### **Section 1.**

The Contractors and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Contractors and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

### **Section 2.**

The Unions and Contractors agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective  
as of the \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_

FOR BUILDING AND CONSTRUCTION TRADES COUNCIL  
OF GREATER NEW YORK AND VICINITY

BY: *Gary LaBarbera*  
Gary LaBarbera  
President

FOR NEW YORK CITY

BY: \_\_\_\_\_  
Michael R. Bloomberg  
Mayor

APPROVED AS TO FORM:

\_\_\_\_\_  
ACTING CORPORATION COUNSEL  
NEW YORK CITY

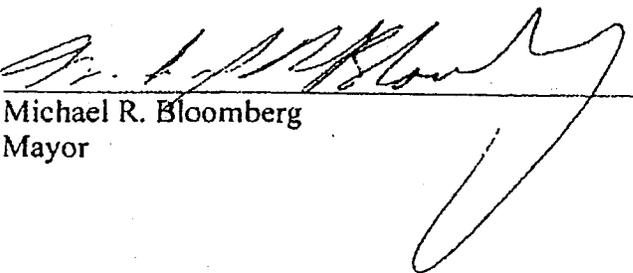
NYC AGENCY RENOVATION & REHAB CITY OWNED BUILDINGS/STRUCTURES

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective  
as of the \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_

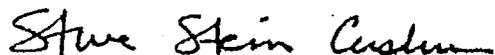
FOR BUILDING AND CONSTRUCTION TRADES COUNCIL  
OF GREATER NEW YORK AND VICINITY

BY: \_\_\_\_\_  
Gary LaBarbera  
President

FOR NEW YORK CITY

BY:   
Michael R. Bloomberg  
Mayor

APPROVED AS TO FORM:

  
ACTING CORPORATION COUNSEL  
NEW YORK CITY

DEC 18 2009

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## List of Signatory Unions

Blasterers and Drillers Local #29

Bricklayers Local No. 1

Boiler Makers Local No. 5

Carpenters District Council

Cement Masons No. 780

Derrickmen and Riggers Union No. 197

Concrete Workers District Council No. 16, including Cement and Concrete Workers Nos. 6-A, 18-A, and 20

Electrical Local No. 3

Drywall Tapers 1974

Elevator Constructors No. 1

Heat & Frost Insulators Local Union No. 12A

Heat & Frost Insulators Local Union No. 12

Iron Workers No. 40

Iron Workers District Council

Laborers Local No. 78 Asbestos & Lead Abatement

Iron Workers No. 361

Laborers Construction and General Building No. 79

Laborers Local 731

Lathers Metallic Local No. 46

Local Union 8A Glaziers No. 1281

Mason Tenders District Council

Metal Polishers DC 9

Painters District Council No. 9

Painters Structural Steel No. 806

Ornamental Iron Workers No. 580

Plasters Local Union No. 262

Pavers & Road Builders District Council No. 1

Plumbers No. 1

Sheet Metal Workers Local No. 28

Roofers & Waterproofers No. 8

Sheet Metal Workers Local No. 137

Steamfitters Local Union No. 638, including Metal Trades Division

Teamsters Local Union 813

Teamsters Local Union 814

Tile, Marble & Terrazzo B.A.C. Local Union No. 7

### PLA Schedule A

The following Collective Bargaining Agreements, as this Schedule may be amended from time to time in accordance with the Agreement, constitute Schedule A:

- (1) Agreement between the Boilermakers Association of Greater New York, Inc. and the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers AFL-CIO, Lodge No. 5, September 1, 2006 - December 31, 2009.
- (2) Agreement between Association of Cement and Concrete Contractors of New York, Inc. and Cement and Concrete Workers comprised of Local No. 6A, Local No. 18A, Local No. 20 and the Employer, July 1, 2008 - June 30, 2011.
- (3) Agreement between the Cement League and the District Council of Cement and Concrete Workers; Comprised of Local No. 6A, Local No. 18A, Local No. 20; July 1, 2008 - June 30, 2011.
- (4) Agreement between the Cement League and the United Cement Masons' Union Local No. 780, Clarified & Extended from October 23, 1940 to June 30, 2011.
- (5) Building Construction agreement between the Building Contractors Association, Inc. and the District Council of New York City and Vicinity of the United Brotherhood of Carpenters and Joiners of America, AFL-CIO, July 1, 2006 - June 30, 2011.
- (6) General Contractors Association - Carpenters 2006; Agreement Between Members of the General Contractors Association of New York, Inc. and the District Council of Carpenters of New York City and Vicinity, July 1, 2006 - June 30, 2011.
- (7) Trade Agreement between Drywall Tapers and Pointers of Greater New York Local Union 1974, affiliated with International Union of Painters and Allied Trades, AFL-CIO and Drywall Taping Contractors' Association of Greater New York and the Association of Wall-Ceiling & Carpentry Industry of New York, Inc., September 6, 2006 - June 28, 2011; Independent Agreement between Local Union 1974 and Employer.
- (8) Agreement between Allied Building Metal Industries, Inc. and Local Union Nos. 40 and 361 of the International Association of Bridge, Structural and Ornamental and Reinforcing Iron Workers AFL-CIO, July 1, 2008 - June 30, 2014.
- (9) Agreement between Independent Contractors and Local #46 Metallic Lathers Union and Reinforcing Ironworkers of New York and Vicinity of the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers, July 1, 2008 - June 30, 2014.
- (10) Agreement of Working Conditions between the Independent Insulation Contractors Association of New York City Inc. and the International Association of Heat and Frost Insulators and Asbestos Workers Local No. 12 of New York City, 2008-2014.

(11) Mason Tenders District Council of Greater New York Master Independent Collective Bargaining Agreement, 2008-2011.

(12) Trade Agreement between District Council No. 9, International Union of Painters and Allied Trades, AFL-CIO and the Association of Master Painters and Decorators of New York, Inc. and the Association of Wall, Ceiling & Carpentry Industries of New York, Inc. and the Window and Plate Glass Dealers Association, May 1, 2005 - April 30, 2011.

(13) Trade Agreement between Enterprise Association Local Union 638 and Mechanical Contractors Association of New York, Inc., July 1, 2008 - June 30, 2011.

(14) Agreement between Allied Building Metal Industries Inc. and Architectural and Ornamental Iron Workers Local Union No. 580 AFL-CIO; July 1, 2008 - June 30, 2011.

(15) Official Working Agreement between Service Contractors Division of the Mechanical Contractors Association of New York and Enterprise Association Metal Trades Branch Local Union 638, July 1, 2007 - June 30, 2010.

(16) Agreement between Association of Contracting Plumbers of the City of New York, Inc. and Local Union No 1 of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada, July 1, 2007 - June 30, 2010.

(17) Agreement and Working Rules between New York Electrical Contractors Association, Inc. and the Association of Electrical Contractors, Inc. and Local Union No. 3 International Brotherhood of Electrical Workers, AFL-CIO, May 10, 2007 - May 13, 2010.

(18) Official Working Agreement between Service Contractors Division of the Mechanical Contractors Association of New York, Inc. and Enterprise Association Metal Trades Branch Local Union 638, Refrigeration, Air Conditioning, Air Cooling, Oil Burner and Stoker Service and Maintenance Technicians, July 1, 2007 - June 30, 2010.

(19) Structural Steel and Bridge Painters of Greater New York, Local Union No. 806, District Council No. 9, International Union of Painters and Allied Trades, AFL-CIO, CLC and New York Structural Steel Painting Contractors Association, Inc.; Collective Bargaining Agreement, October 1, 2005 - September 30, 2011.

(20) Trade Agreement between United Derrickmen & Riggers Association, Local No. 197 of New York, All long Island, Westchester and Vicinity and Building Stone and Pre-Case Contractors Association, 2008.

(21) Agreement between the Greater New York and New Jersey Tile Contractors Association, Inc., and the Tile Setters and Tile Finishers Union of New York and New Jersey, Local Union No. 7 of the International Union of Bricklayers and Allied Craftworkers, June 8, 2009 - June 2, 2013.

(22) Agreement between The Building Contractors Association, Inc. and International Union of Operating Engineers Local 15 and 15 A, July 1, 2006-June 30, 2011.

(23) Agreement dated as of July 1, 2006 between Building Contractors Association and International Union of Operating Engineers Local 14-14B, July 1, 2006-June 30, 2011.

(24) Agreement Between The Building Contractors Association, Inc. and International Union of Operating Engineers Local 15D affiliated with the AFL-CIO, July 1, 2006-June 30, 2011.

(25) Local 282 International Brotherhood of Teamsters High Rise Contract, Building Contractors Association and Independents, 2008-2013.

(26) Building, Concrete, Excavation & Common Laborers Union Local No. 731 Independent Agreement, July 1, 2006-June 30, 2012.

(27) March 17, 2009 Agreement between ThyssenKrupp Elevator Corp. and International Union of Elevator Constructors, Local 1 of NY and NJ, 2009-2014.

(28) Working Agreement Local Union No. 8 United Union of Roofers, Waterproofers and Allied Workers and Roofing and Waterproofing Contractor's Association of New York and Vicinity, July 1, 2009-June 30, 2011.

(29) Standard Form Collective Bargaining Agreement between Sheet Metal Workers' International Association Local Union #137 and the Greater New York Sign Association, July 16, 2007 - July 15, 2010.

(30) Trade Agreement between \_\_\_\_\_ and Local No. 1 New York of the International Union of Bricklayers and Allied Craftworkers, July 1, 2008 - July 30, 2011.

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**Project Labor Agreement - - Letter of Assent**

Dear:

The undersigned party confirms that it agrees to be a party to and be bound by the New York Agency, Project Labor Agreement as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter Contractor) on the Project known as \_\_\_\_\_ and located at \_\_\_\_\_ (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the Project Labor Agreement, a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Agreement, together with any and all schedules; amendments and supplements now existing or which are later made thereto:
- (2) Agrees to be bound by the legally established collective bargaining agreements and local trust agreements as set forth in the Project Labor Agreement and this Agreement but only to the extent of Program Work and as required by the PLA.
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor but only to the extent of Program Work as required by the PLA.
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it has engaged or may engage to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee provisions.
- (5) Agrees to secure from any Contractor(s) (as defined in said Agreement) which is or becomes a Subcontractor (of any tier), to it, a duly executed Agreement to be Bound in from identical to this document.

Dated: \_\_\_\_\_ (Name of Contractor or subcontractor)

\_\_\_\_\_  
(Name of CM; GC; Contractor or Higher Level Subcontractor) (Authorized Officer & Title)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Phone) (Fax)

Contractor's State License # \_\_\_\_\_

Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2009

\_\_\_\_\_  
Notary Public

### STANDARDS OF EXCELLENCE

The purpose of this Standard of Excellence is to reinforce the pride of every construction worker and the commitment to be the most skilled, most productive and safest workforce available to construction employers and users in the City of New York. It is the commitment of every affiliated local union to use our training and skills to produce the highest quality work and to exercise safe and productive work practices.

The rank and file members represented by the affiliated local unions acknowledge and adopt the following standards:

- *Provide a full days work for a full days pay;*
- *Safely work towards the timely completion of the job;*
- *Arrive to work on time and work until the contractual quitting time;*
- *Adhere to contractual lunch and break times;*
- *Promote a drug and alcohol free work site;*
- *Work in accordance with all applicable safety rules and procedures;*
- *Allow union representatives to handle job site disputes and grievances without resort to slowdowns, or unlawful job disruptions;*
- *Respect management directives that are safe, reasonable and legitimate;*
- *Respect the rights of co-workers;*
- *Respect the property rights of the owner, management and contractors.*

The Unions affiliated with the New York City Building and Construction Trades Council will expect the signatory contractors to safely and efficiently manage their jobs and the unions see this as a corresponding obligation of the contractors under this Standard of Excellence. The affiliated unions will expect the following from its signatory contractors:

- *Management adherence to the collective bargaining agreements;*
- *Communication and cooperation with the trade foremen and stewards;*
- *Efficient, safe and sanitary management of the job site;*
- *Efficient job scheduling to mitigate and minimize unproductive time;*
- *Efficient and adequate staffing by properly trained employees by trade;*
- *Efficient delivery schedules and availability of equipment and tools to ensure efficient job progress;*
- *Ensure proper blueprints, specifications and layout instructions and material are available in a timely manner*
- *Promote job site dispute resolution and leadership skills to mitigate such disputes;*
- *Treatment of all employees in a respectful and dignified manner acknowledging their contributions to a successful project.*

The affiliated unions and their signatory contractors shall ensure that both the rank and file members and the management staff shall be properly trained in the obligations undertaken in the Standard of Excellence.

# **NOTICE TO BIDDERS**

## **DAMAGES FOR DELAY PILOT PROGRAM**

**Please be advised that this contract is part of a pilot program in which the Standard Construction Contract provisions concerning delay damages have been revised to allow contractors to be reimbursed for specified additional costs that are attributable to a delay in the performance of the work resulting from certain acts or omissions of the City agency or its representatives. Certain changes are highlighted here to alert bidders to the pilot program. Please see Articles 11, 12.3, and 13.10 of the Standard Construction Contract for a full understanding and the actual text of the pilot program. The text of the revised Standard Construction Contract is the controlling document should there be any discrepancies between this notice and the Standard Construction Contract.**

Changes to Articles 11, 12.3, and 13.10 of the Standard Construction Contract permit contractors to make claims for delay damages relating to the following circumstances:

The failure of the City to take reasonable measures to coordinate and progress the Work;

Extended delays attributable to the City in the review or issuance of change orders, in shop drawing reviews and approvals or as a result of the cumulative impact of multiple change orders, which constitute a material change to the Work and which have a verifiable impact on project costs.

The unavailability of the site for an extended period of time that significantly affects the scheduled completion of the contract.

The issuance by the City of a stop work order relative to a substantial portion of work for a period exceeding thirty days, that was not brought about through any action or omission of the Contractor.

Differing site conditions that were not known or reasonably ascertainable on a pre-bid inspection of the site or review of the bid documents or other publicly available sources and that are not ordinarily encountered in the Project's geographical area or neighborhood or in the type of work to be performed.

Delays caused by the City's bad faith or its willful, malicious, or grossly negligent conduct;

Delays not contemplated by the parties;

Delays so unreasonable that they constitute an intentional abandonment of the Contract by the City; and

Delays resulting from the City's breach of a fundamental obligation of the Contract.

Please see Article 11.4 for provisions regarding compensable delays.

Specific exclusions to claims for damages also apply, such as for third party (non-City) acts and omissions, court orders, strikes or *force majeure* events. For provisions related to non-compensable delays, please see Article 11.5.

For those delays where damages are available, Article 11 also sets forth what costs are recoverable. Please see Article 11.7 for which costs are recoverable and which costs are non-recoverable.

Article 11 also contains provisions concerning notice and documentation of claims. Please see Articles 11.1, 11.2, and 11.6. Contractors must comply with the notice requirements in order to preserve their claims. Consequently, please read these sections carefully. Delay damages are compensable only if they were actually, reasonably and necessarily incurred and are verified by appropriate documentation submitted at the appropriate times.

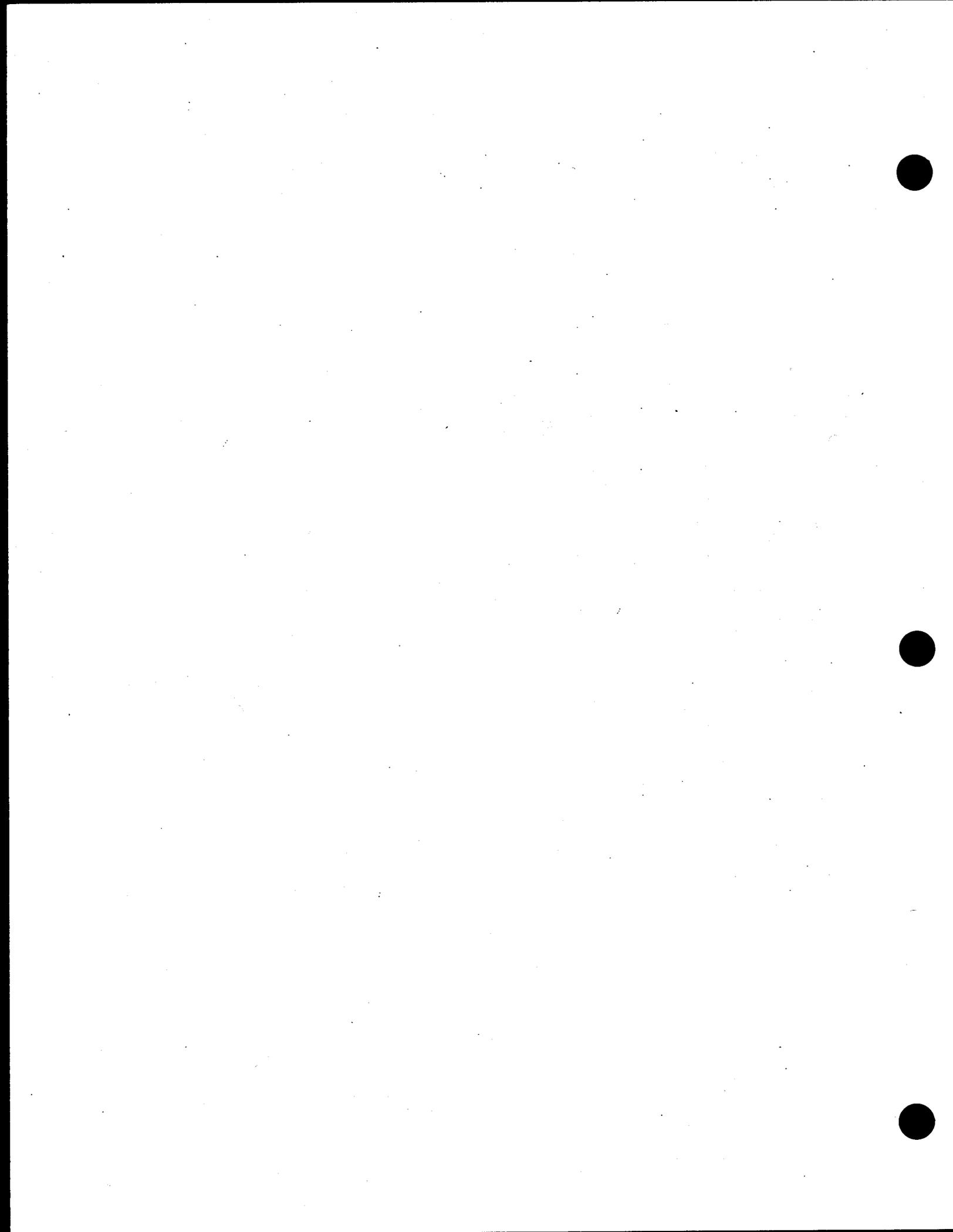
Claims for delay damages are not covered by the dispute resolution process in Article 27 of the Standard Construction Contract. See Article 11.8. When the amount of delay damages are agreed upon, such damages may be paid through a change order.

# NOTICE TO BIDDERS

Please be advised that the City of New York has revised the form of the performance bond that is required for City construction contracts that do not exceed \$5 million. The form of bond required for contracts that are greater than \$5 million has not changed. The City now has two approved forms. One form is to be used for contracts that do not exceed \$5 million and one form is to be used for contracts above \$5 million. The City's payment bond remains unchanged.

**The new bond form for contracts that do not exceed \$5 million has been approved by the U.S. Small Business Administration ("SBA") for participation in their Bond Guarantee Program.** The SBA's Bond Guarantee Program enables eligible small businesses to obtain or increase bonding by having the SBA act as a partial guarantor of the contractor to the surety. If you are interested in participating in this program, we suggest that you contact your broker or the SBA.

In order to maximize participation by small businesses in the SBA Guarantee Program, the City also encourages prime contractors who are awarded contracts greater than \$5 million to allow their subcontractors to use the SBA-approved form, particularly on contracts that are subject to Local Law 129 (the M/WBE program), if the prime contractor requires subcontractors to obtain performance bonds.



## **NOTICE TO BIDDERS, PROPOSERS, CONTRACTORS, AND RENEWAL CONTRACTORS**

This contract includes a provision concerning the protection of employees for whistleblowing activity, pursuant to New York City Local Law Nos. 30-2012 and 33-2012, effective October 18, 2012 and September 18, 2012, respectively. The provisions apply to contracts with a value in excess of \$100,000.

Local Law No. 33-2012, the Whistleblower Protection Expansion Act (“WPEA”), prohibits a contractor or its subcontractor from taking an adverse personnel action against an employee or officer for whistleblower activity in connection with a City contract; requires that certain City contracts include a provision to that effect; and provides that a contractor or subcontractor may be subject to penalties and injunctive relief if a court finds that it retaliated in violation of the WPEA. The WPEA is codified at Section 12-113 of the New York City Administrative Code.

Local Law No. 30-2012 requires a contractor to prominently post information explaining how its employees can report allegations of fraud, false claims, criminality, or corruption in connection with a City contract to City officials and the rights and remedies afforded to employees for whistleblowing activity. Local Law No. 30-2012 is codified at Section 6-132 of the New York City Administrative Code.

## WHISTLEBLOWER PROTECTION EXPANSION ACT RIDER

1. In accordance with Local Law Nos. 30-2012 and 33-2012, codified at sections 6-132 and 12-113 of the New York City Administrative Code, respectively,
  - (a) Contractor shall not take an adverse personnel action with respect to an officer or employee in retaliation for such officer or employee making a report of information concerning conduct which such officer or employee knows or reasonably believes to involve corruption, criminal activity, conflict of interest, gross mismanagement or abuse of authority by any officer or employee relating to this Contract to (i) the Commissioner of the Department of Investigation, (ii) a member of the New York City Council, the Public Advocate, or the Comptroller, or (iii) the City Chief Procurement Officer, ACCO, Agency head, or Commissioner.
  - (b) If any of Contractor's officers or employees believes that he or she has been the subject of an adverse personnel action in violation of subparagraph (a) of paragraph 1 of this rider, he or she shall be entitled to bring a cause of action against Contractor to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (i) an injunction to restrain continued retaliation, (ii) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (iii) reinstatement of full fringe benefits and seniority rights, (iv) payment of two times back pay, plus interest, and (v) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney's fees.
  - (c) Contractor shall post a notice provided by the City in a prominent and accessible place on any site where work pursuant to the Contract is performed that contains information about:
    - (i) how its employees can report to the New York City Department of Investigation allegations of fraud, false claims, criminality or corruption arising out of or in connection with the Contract; and
    - (ii) the rights and remedies afforded to its employees under New York City Administrative Code sections 7-805 (the New York City False Claims Act) and 12-113 (the Whistleblower Protection Expansion Act) for lawful acts taken in connection with the reporting of allegations of fraud, false claims, criminality or corruption in connection with the Contract.
  - (d) For the purposes of this rider, "adverse personnel action" includes dismissal, demotion, suspension, disciplinary action, negative performance evaluation, any action resulting in loss of staff, office space, equipment or other benefit, failure to appoint, failure to promote, or any transfer or assignment or failure to transfer or assign against the wishes of the affected officer or employee.
  - (e) This rider is applicable to all of Contractor's subcontractors having subcontracts with a value in excess of \$100,000; accordingly, Contractor shall include this rider in all subcontracts with a value a value in excess of \$100,000.
2. Paragraph 1 is not applicable to this Contract if it is valued at \$100,000 or less. Subparagraphs (a), (b), (d), and (e) of paragraph 1 are not applicable to this Contract if it was solicited pursuant to a finding of an emergency. Subparagraph (c) of paragraph 1 is neither applicable to this Contract if it was solicited prior to October 18, 2012 nor if it is a renewal of a contract executed prior to October 18, 2012.

## Notice to Bidders:

In 2013 the City will be implementing a new web based subcontractor reporting system. Once this contractor reporting system is implemented, and Contractor receives notice of its implementation, Contractor will be required to list in the system all of the subcontractors that it knows it will use or is already using in the performance of this contract. For each subcontractor listed, Contractor will be required to provide the following information: maximum contract value, description of subcontractor work, start and end date of the subcontract and identification of the subcontractor's industry. Identification of subcontractors in the system along with the required information will be required in order to obtain subcontractor approval under [section 3.02 of Appendix A][ Article 17 of the Standard Construction Contract] and PPB Rule § 4-13 for all subcontractors that have not been approved as of the implementation date. Thereafter, Contractor will be required to report in the system the payments made to each subcontractor within 30 days of making the payment. If any of the required information changes throughout the term of the contract, Contractor will be required to revise the information in the system...

When the subcontractor reporting system is implemented, Contractor will receive a written notice from the City which will contain the information the Contractor will need to list its subcontractors and report payments. Contractor will not be required to comply with the requirements set forth herein until such notice is issued. Contractor will have 30 days from the date of the notice to list its current subcontractors for which it has already received Agency approval, if any. Thereafter, for those subcontractors that have not yet been approved by the Agency, subcontractors will have to be listed in the system in order to obtain the required Agency approval.

Failure of the Contractor to list a subcontractor and/or to report subcontractor payments in a timely fashion may result in the Agency declaring the Contractor in default of the Contract and may subject Contractor to liquidated damages in the amount of \$100 per day for each day that the Contractor fails to identify a subcontractor along with the required information about the subcontractor and/or fails to report payments to a subcontractor, beyond the time frames set forth herein or in the notice from the City. For construction contracts, the provisions of Article 15 of the Standard Construction Contract shall govern the issue of liquidated damages.

Contractor hereby agrees to these provisions and acknowledges that they will become effective on the date set forth in the notice.

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**CITY OF NEW YORK**

**DEPARTMENT OF  
DESIGN AND CONSTRUCTION  
DIVISION OF STRUCTURES**

**INFORMATION FOR BIDDERS**

**DELAY DAMAGES PILOT**

**September 2008**

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## INFORMATION FOR BIDDERS

### 1. Description and Location of Work

The description and location of the work for which bids are requested are specified in Attachment 1, "Bid Information". Attachment 1 is included in the Bid Booklet.

### 2. Time and Place for Receipt of Bids

Sealed bids shall be received on or before the date and hour specified in Attachment 1, at which time they will be publicly opened and read aloud in the presence of the Commissioner or his or her representative, and any bidders who may desire to be present.

### 3. Definitions

The definitions set forth in the Procurement Policy Board Rules shall apply to this Invitation For Bids.

### 4. Invitation For Bids and Contract Documents

(A) Except for titles, sub-titles, headings, running headlines, tables of contents and indices (all of which are printed herein merely for convenience) the following, except for such portions thereof as may be specifically excluded, shall be deemed to be part of the Contract and the Invitation for Bids.

- (1) All provisions required by law to be inserted in this Contract, whether actually inserted or not
- (2) The Contract Drawings and Specifications
- (3) The General Conditions, the General Requirements and the Special Conditions, if any
- (4) The Contract
- (5) The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and, if used, the Bid Booklet
- (6) The Budget Director's Certificate; all Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed with the Work.

(B) For particulars as to this procurement, including quantity and quality of the purchase, extent of the work or labor to be performed, delivery and performance schedule, and any other special instructions, prospective bidders are referred to the Invitation For Bids Documents. A copy of such documents can be obtained at the location set forth in Attachment 1.

(C) Deposit for Copy of Invitation For Bids Documents: Prospective bidders may obtain a copy of the Invitation For Bids Documents by complying with the conditions set forth in the Notice of Solicitation. The deposit must be in the form of a check or money order made payable to the City of New York, and drawn upon a state or national bank or trust company, or a check of such bank or trust company signed by a duly authorized officer thereof.

(D) Return of Invitation For Bids Documents: All Invitation For Bids Documents must be returned to the Department upon request. If the bidder elects not to submit a bid thereunder, the Invitation For Bids Documents shall be returned to the Department, along with a statement that no bid will be submitted.

(E) Return of Deposit: Such deposit will be returned within 30 days after the award of the contract or the rejection of all bids as set forth in the advertisement, provided the Invitation For Bids Documents are returned to the location specified in Attachment 1, in physical condition satisfactory to the Commissioner.

(F) Additional Copies: Additional copies of the Invitation For Bids Documents may be obtained, subject to the conditions set forth in the advertisement for bids.

5. Pre-Bid Conference

A pre-bid conference shall be held as set forth in Attachment 1. Nothing stated at the pre-bid conference shall change the terms or conditions of the Invitation For Bids Documents, unless a change is made by written amendment as provided in Section 9 below. Failure to attend a mandatory pre-bid conference shall constitute grounds for the rejection of the bid.

6. Agency Contact

Any questions or correspondence relating to this bid solicitation shall be addressed to the Agency Contact person specified in Attachment 1.

7. Bidder's Oath

(A) The bid shall be properly signed by an authorized representative of the bidder and the bid shall be verified by the written oath of the authorized representative who signed the bid, that the several matters stated and information furnished therein are in all aspects true.

(B) A materially false statement willfully or fraudulently made in connection with the bid or any of the forms completed and submitted with the bid may result in the termination of any Contract between the City and the Bidder. As a result, the Bidder may be barred from participating in future City contracts as well as be subject to possible criminal prosecution.

8. Examination and Viewing of Site, Consideration of Other Sources of Information and Changed Conditions

(A) Pre-Bidding (Investigation) Viewing of Site - Bidders must carefully view and examine the site of the proposed work, as well as its adjacent area, and seek other usual sources of information, for they will be conclusively presumed to have full knowledge of any and all conditions on, about or above the site relating to or affecting in any way the performance of the work to be done under the Contract which were or should have been indicated to a reasonably prudent bidder. To arrange a date for visiting the work site, bidders are to contact the Agency Contact person specified in Attachment 1.

(B) Should the contractor encounter during the progress of the work subsurface conditions at the site materially differing from any shown on the Contract Drawings or indicated in the Specifications or such subsurface conditions as could not reasonably have been anticipated by the contractor and were not anticipated by the City, which conditions will materially affect the cost of the work to be done under the Contract, the attention of the Commissioner must be called immediately to such conditions before they are disturbed. The Commissioner shall thereupon promptly investigate the conditions. If he finds that they do so materially differ, or that they could not reasonably have been anticipated by the contractor and were not anticipated by the City, the Contract may be modified with his written approval.

9. Examination of Proposed Contract

(A) Request for Interpretation or Correction: Prospective bidders must examine the Contract Documents carefully and before bidding must request the Commissioner in writing for an interpretation or correction of every patent ambiguity, inconsistency or error therein which should have been discovered by a reasonably prudent bidder. Such interpretation or correction, as well as any additional contract provisions the Commissioner may decide to include, will be issued in writing by the Commissioner as an addendum to the Contract, which will be transmitted to each person recorded as having received a copy of the Contract Documents from the Department. Transmission of such addendum will be by mail, e-mail, facsimile or hand delivery. Such addendum will also be posted at the place where the Contract Documents are available for the inspection of prospective bidders. Upon transmission as provided for herein, such addendum shall become a part of the Contract Documents, and binding on all bidders, whether or not actual notice of such addendum is shown.

(B) Only Commissioner's Interpretation or Correction Binding: Only the written interpretation or correction so given by the Commissioner shall be binding, and prospective bidders are warned that no other officer, agent or employee of the City is authorized to give information concerning, or to explain or interpret, the Contract.

(C) Documents given to a subcontractor for the purpose of soliciting the subcontractor's bid shall include either a copy of the bid cover sheet or a separate information sheet setting forth the project name, the Contract number (if available), the contracting agency and the Project's location.

10. Form of Bid

Each bid must be submitted upon the prescribed form and must contain: a) the name, residence and place of business of the person or persons making the same; b) the names of all persons interested therein, and if no other person is so interested, such fact must be distinctly stated; c) a statement to the effect that it is made without any connection with any other person making a bid for the same purpose and that it is in all respects fair and without collusion or fraud; d) a statement that no Council member or other officer or employee or person whose salary is payable in whole or part from the City Treasury is directly or indirectly interested therein or in the supplies, materials or equipment and work or labor to which it relates, or in any portion of the profits thereof; e) a statement that the bidder is not in arrears to the City or to any agency upon a debt or contract or taxes, and is not a defaulter as surety or otherwise upon any obligation to the City to any agency thereof, except as set forth in the bid.

THE BID SHALL BE TYPEWRITTEN OR WRITTEN LEGIBLY IN INK. THE BID SHALL BE SIGNED IN INK. ERASURES OR ALTERATIONS SHALL BE INITIALED BY THE SIGNER IN INK. FAILURE TO CONFORM TO THE REQUIREMENTS OF THIS SECTION 10 SHALL RESULT IN THE REJECTION OF THE BID.

11. Irrevocability of Bid

The prices set forth in the bid cannot be revoked and shall be effective until the award of the Contract, unless the bid is withdrawn as provided for in Sections 15 and 18 below.

12. Acknowledgment of Amendments

The receipt of any amendment to the Contract Documents shall be acknowledged by the bidder in its bid submission.

13. Bid Samples and Descriptive Literature

Bid samples and descriptive literature shall not be submitted by the bidder, unless expressly requested elsewhere in the Contract or Contract Documents. Any unsolicited bid samples or descriptive literature which are submitted shall not be examined or tested and shall not be deemed to vary any of the provisions of this Contract.

14. Proprietary Information/Trade Secrets

(A) The bidder shall identify those portions of the bid which it deems to be confidential, proprietary information or trade secrets, and provide justification why such materials shall not be disclosed by the City. All such materials shall be clearly indicated by stamping the pages on which such information appears, at the top and bottom thereof with the word "Confidential". Such materials stamped "Confidential" must be easily separable from the non-confidential sections of the bid.

(B) All such materials so indicated shall be reviewed by the Agency and any decision not to honor a request for confidentiality shall be communicated in writing to the bidder. For those bids which are unsuccessful, all such confidential materials shall be returned to the bidder. Prices, makes and model or catalog numbers of the items offered, deliveries, and terms of payment shall be publicly available after bid opening, regardless of any designation of confidentiality made by the bidder.

15. Pre-Opening Modification or Withdrawal of Bids

Bids may be modified or withdrawn by written notice received in the office designated in Attachment 1, before the time and date set for the bid opening. If a bid is withdrawn in accordance with this Section, the bid security, if any, shall be returned to the bidder.

16. Bid Evaluation and Award

In accordance with the New York City Charter, the Procurement Policy Board Rules and the terms and conditions of this Invitation For Bids, this Contract shall be awarded, if at all, to the responsible bidder whose bid meets the requirements and evaluation criteria set forth in the Invitation For Bids, and whose bid price is either the most favorable bid price or, if the Invitation For Bids so states, the most favorable evaluated bid price. A bid may not be evaluated for any requirement or criterion that is not disclosed in the Invitation For Bids.

Restriction: No negotiations with any bidder shall be allowed to take place except under the circumstances and in the manner set forth in Section 21. Nothing in this Section shall be deemed to permit a contract award to a bidder submitting a higher quality item than that designated in the Invitation For Bids, if that bid is not also the most favorable bid.

17. Late Bids, Late Withdrawals and Late Modifications

Any bid received at the place designated in the solicitation after the time and date set for receipt of bids is late and shall not be considered. Any request for withdrawal or modification received at the place designated in the solicitation after the time and date set for receipt of bids is late and shall not be considered. The exception to this provision is that a late modification of a successful bid that makes the bid terms more favorable to the City shall be considered at any time it is received.

18. Withdrawal of Bids.

Except as provided for in Section 15, above, a bidder may not withdraw its bid before the expiration of forty-five (45) days after the date of the opening of bids; thereafter, a bidder may withdraw its bid only in writing and in advance of an actual award. If within sixty (60) days after the execution of the Contract, the Commissioner fails to fix the date for commencement of work by written notice to the bidder, the bidder, at his option, may ask to be relieved of his obligation to perform the work called for by written notice to the Commissioner. If such notice is given to the Commissioner, and the request to withdraw is granted, the bidder waives all claims in connection with this Contract.

19. Mistake in Bids

(A) Mistake Discovered Before Bid Opening: A bidder may correct mistakes discovered before the time and date set for bid opening by withdrawing or correcting the bid as provided in Section 15 above.

(B) Mistakes Discovered Before Award

(1) In accordance with General Municipal Law (Section 103, subdivision 11), where a unilateral error or mistake is discovered in a bid, such bid may be withdrawn upon written approval of the Agency Chief Contracting Officer if the following conditions are met:

- (a) The mistake is known or made known to the agency prior to the awarding of the Contract or within 3 days after the opening of the bid, whichever period is shorter; and
- (b) The price bid was based upon an error of such magnitude that enforcement would be unconscionable; and

- (c) The bid was submitted in good faith and the bidder submits credible evidence that the mistake was a clerical error as opposed to a judgment error; and
- (d) The error in the bid is actually due to an unintentional and substantial arithmetic error or an unintentional omission of a substantial quantity of work, labor, material or services made directly in the compilation of the bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of the original work paper, documents, or materials used in the preparation of the bid sought to be withdrawn; and
- (e) It is possible to place the agency in the same position as existed prior to the bid.

(2) Unless otherwise required by law, the sole remedy for a bid mistake in accordance with this Article shall be withdrawal of the bid, and the return of the bid bond or other security, if any, to the bidder. Thereafter, the agency may, in its discretion, award the Contract to the next lowest bidder or rebid the Contract. Any amendment to or reformation of a bid or a Contract to rectify such an error or mistake therein is strictly prohibited.

(3) If the mistake and the intended correct bid are clearly evident on the face of the bid document, the bid shall be corrected to the intended correct bid and may not be withdrawn. Examples of mistakes that may be corrected are typographical errors, errors in extending unit prices, transposition errors and arithmetical errors.

#### 20. Low Tie Bids

(A) When two or more low responsive bids from responsible bidders are identical in price, meeting all the requirements and criteria set forth in the Invitation For Bids, the Agency Chief Contracting Officer will break the tie in the following manner and order of priority:

- (1) Award to a certified New York City small, minority or woman-owned business entity bidder;
- (2) Award to a New York City bidder;
- (3) Award to a certified New York State small, minority or woman-owned business bidder;
- (4) Award to a New York State bidder.

(B) If two or more bidders still remain equally eligible after application of paragraph (A) above, award shall be made by a drawing by lot limited to those bidders. The bidders involved shall be invited to attend the drawing. A witness shall be present to verify the drawing and shall certify the results on the bid tabulation sheet.

#### 21. Rejection of Bids

(A) Rejection of Individual Bids: The Agency may reject a bid if:

- (1) The bidder fails to furnish any of the information required pursuant to Section 24 or 28 hereof; or if
- (2) The bidder is determined to be not responsible pursuant to the Procurement Policy Board Rules; or if
- (3) The bid is determined to be non-responsive pursuant to the Procurement Policy Board Rules; or if
- (4) The bid, in the opinion of the Agency Chief Contracting Officer, contains unbalanced bid prices and is thus non-responsive, unless the bidder can show that the prices are not unbalanced for the probable required quantity of items, or if the imbalance is corrected pursuant to Section 15.

(B) Rejection of All Bids: The Agency, upon written approval by the Agency Chief Contracting Officer, may reject all bids and may elect to resolicit bids if in its sole opinion it shall deem it in the best interest of the City so to do.

(C) Rejection of All Bids and Negotiation With All Responsible Bidders: The Agency Head may determine that it is appropriate to cancel the Invitation For Bids after bid opening and before award and to complete the acquisition by negotiation. This determination shall be based on one of the following reasons:

- (1) All otherwise acceptable bids received are at unreasonable prices, or only one bid is received and the Agency Chief Contracting Officer cannot determine the reasonableness of the bid price, or no responsive bid has been received from a responsible bidder; or
- (2) In the judgment of the Agency Chief Contracting Officer, the bids were not independently arrived at in open competition, were collusive, or were submitted in bad faith.

(D) When the Agency has determined that the Invitation for Bids is to be canceled and that use of negotiation is appropriate to complete the acquisition, the contracting officer may negotiate and award the Contract without issuing a new solicitation, subject to the following conditions:

- (1) prior notice of the intention to negotiate and a reasonable opportunity to negotiate have been given by the contracting officer to each responsible bidder that submitted a bid in response to the Invitation for Bids;
- (2) the negotiated price is the lowest negotiated price offered by a responsible bidder; and
- (3) the negotiated price is lower than the lowest rejected bid price of a responsible bidder that submitted a bid in response to the Invitation for Bids.

22. Right to Appeal Determinations of Non-Responsiveness or Non-Responsibility and Right to Protest Solicitations and Award

The bidder has the right to appeal a determination of non-responsiveness or non-responsibility and has the right to protest a solicitation and award. For further information concerning these rights, the bidder is directed to the Procurement Policy Board Rules.

23. Affirmative Action and Equal Employment Opportunity

This Invitation For Bids is subject to applicable provisions of Federal, State and Local Laws and executive orders requiring affirmative action and equal employment opportunity.

24. VENDEX Questionnaires

(A) Requirement: Pursuant to Administrative Code Section 6-116.2 and the PPB Rules, bidders may be obligated to complete and submit VENDEX Questionnaires. Generally, if this bid is \$100,000 or more, or if this bid when added to the sum total of all contracts, concessions and franchises the bidder has received from the City and any subcontracts received from City contractors over the past twelve months, equals or exceeds \$100,000, Vendex Questionnaires must be completed. If required, Vendex Questionnaires must be completed and submitted before any award of contract may be made or before approval is given for a proposed subcontractor. Non-compliance with these submission requirements may result in the disqualification of the bid, disapproval of a subcontractor, subsequent withdrawal of approval for the use of an approved subcontractor, or the cancellation of the contract after its award.

(B) Submission: Vendex Questionnaires must be submitted directly to the Mayor's Office of Contract Services, ATTN: Vendex, 253 Broadway, 9<sup>th</sup> Floor, New York, New York 10007. In addition, the bidder must submit a Confirmation of Vendex Compliance to the agency. A form for this confirmation is set forth in the Bid Booklet.

(C) Obtaining Forms: Vendex Questionnaires, as well as detailed instructions, may be obtained at [www.nyc.gov/vendex](http://www.nyc.gov/vendex). The bidder may also obtain Vendex forms and instructions by contacting the Agency Chief Contracting Officer or the contact person for this contract.

25. Complaints About the Bid Process

The New York City Comptroller is charged with the audit of contracts in New York City. Any vendor who believes that there has been unfairness, favoritism or impropriety in the bid process should inform the Comptroller, Office of Contract Administration, One Centre Street, Room 835, New York, New York; telephone number (212)669-2797.

26. Bid, Performance and Payment Security

(A) Bid Security: Each bid must be accompanied by bid security in an amount and type specified in Attachment 1. The bid security shall assure the City of New York of the adherence of the bidder to its proposal, the execution of the Contract, and the furnishing of Performance and Payment Bonds by the bidder, if required in Attachment 1. Bid security shall be returned to the bidder as follows:

- (1) Within ten (10) days after the bid opening, the Comptroller will be notified to return the deposits of all but the three (3) lowest bidders. Within five (5) days after the award, the Comptroller will be notified to return the deposits of the remaining two unsuccessful bidders.
- (2) Within five (5) days after the execution of the Contract and acceptance of the Contractor's bonds, the Comptroller will be notified to return the bid security of the successful bidder or, if performance and payment bonds are not required, only after the sum retained under Article 21 of the Contract equals the amount of the bid security.
- (3) Where all bids are rejected, the Comptroller will be notified to return the deposit of the three (3) lowest bidders at the time of rejection.

(B) Performance and Payment Security: Performance and Payment Security must be provided in an amount and type specified in Attachment 1. The performance and payment security shall be delivered by the contractor prior to or at the time of execution of the Contract. If a contractor fails to deliver the required performance and payment security, its bid security shall be enforced, and an award of Contract may be made to the next lowest responsible and responsive bidder, or the contract may be rebid.

(C) Acceptable Types of Security: Acceptable types of security for bids, performance, and payment shall be limited to the following:

- (1) a one-time bond in a form satisfactory to the City;
- (2) a bank certified check or money order;
- (3) obligations of the City of New York; or
- (4) other financial instruments as determined by the Office of Construction in consultation with the Comptroller.

Whenever the successful bidder deposits obligations of the City of New York as performance and payment security, the Comptroller may sell and use the proceeds thereof for any purpose for which the principal or surety on such bond would be liable under the terms of the Contract. If the money is deposited with the Comptroller, the successful bidder shall not be entitled to receive interest on such money from the City.

(D) Form of Bonds: Security provided in the form of bonds must be prepared on the form of bonds authorized by the City of New York. Forms for bid, performance, and payment bonds are included in the Invitation for Bids Documents. Such bonds must have as surety thereunder such surety company or companies as are: (1) approved by the City of New York; (2) authorized to do business in the State of New York, and (3) approved by the Department of the Treasury of the United States. Premiums for any required bonds must be included in the base bid.

The bidder is advised that submission of a bid bond where the surety on such bond fails to meet the criteria set forth herein, shall result in the rejection of the bid as non-responsive.

The Department of the Treasury of the United States advises that information concerning approved surety companies may be obtained as follows: (1) from the Government Printing Office at 202-512-1800; (2) through the Internet at <http://www.fms.treas.gov/c570/index.html>, and (3) through a computerized public bulletin board, which can be accessed by using your computer modem and dialing 202-874-6887.

(E) Power of Attorney: Attorneys in fact who sign bid, performance, or payment bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

27. Failure to Execute Contract

In the event of failure of the successful bidder to execute the Contract and furnish the required security within ten (10) days after notice of the award of the Contract, the deposit of the successful bidder or so much thereof as shall be applicable to the amount of the award made shall be retained by the City, and the successful bidder shall be liable for and hereby agrees to pay on demand the difference between the price bid and the price for which such Contract shall be subsequently awarded, including the cost of any required reletting and less the amount of such deposit. No plea of mistake in such accepted bid shall be available to the bidder for the recovery of the deposit or as a defense to any action based upon such accepted bid. Further, should the bidder's failure to comply with this Section cause any funding agency, body or group (Federal, State, City, Public, Private, etc.) to terminate, cancel or reduce the funding on this project, the bidder in such event shall be liable also to the City for the amount of actual funding withdrawn by such agency on this project, less the amount of the forfeited deposit.

28. Bidder Responsibilities and Qualifications

(A) Bidders must include with their bids all information necessary for a determination of bidder responsibility, as set forth in the Specifications.

(B) The Agency may require any bidder or prospective bidder to furnish all books of account, records, vouchers, statements or other information concerning the bidder's financial status for examination as may be required by the Agency to ascertain the bidder's responsibility and capability to perform the Contract. If required, a bidder must also submit a sworn statement setting forth such information as the Agency may require concerning present and proposed plant and equipment, the personnel and qualifications of his working organizations, prior experience and performance record.

(C) Oral Examination on Qualifications: In addition thereto, and when directed by the Agency, the bidder, or a responsible officer, agent or employee of the bidder, must submit to an oral examination to be conducted by the Agency in relation to his proposed tentative plan and schedule of operations, and such other matters as the Agency may deem necessary in order to determine the bidder's ability and responsibility to perform the work in accordance with the Contract. Each person so examined must sign and verify a stenographic transcript of such examination noting thereon such corrections as such person may desire to make.

(D) If the bidder fails or refuses to supply any of the documents or information set forth in paragraph (B) hereof or fails to comply with any of the requirements thereof, the Agency may reject the bid.

29. Employment Report

In accordance with Executive Order No. 50 (1980) as modified by Executive Order 108 (1986), the filing of a completed Employment Report (ER) is a requirement of doing business with the City of New York for construction contractors with contracts of \$1,000,000 or more and subcontractors with construction subcontracts of \$750,000 or more. The required forms and information are included in the Bid Booklet.

30. Labor Law Requirements

(A) General: The successful bidder will be required to comply strictly with all Federal, State and local labor laws and regulations.

(B) New York State Labor Law: This Contract is subject to New York State Labor Law Section 220, which requires that construction workers on the site be paid prevailing wages and supplements. The Contractor is reminded that all wage provisions of this Contract will be enforced strictly and failure to comply will be considered when evaluating performance. Noncompliance may result in the contractor being debarred by the City from future contracts. Complaints filed with the Comptroller may result in decisions which may debar a contractor from bidding contracts with any state governmental entity and other political subdivisions.

(C) Records: The Contractor is expected to submit accurate payroll reports and other required documents and verify attendance and job classifications being utilized in compliance with the law, Contract provisions and agency procedures.

31. Insurance

(A) Bidders are advised that the insurance requirements contained herein are regarded as material terms of the Contract. As required by Article 22 of the Contract, the contractor must effect and maintain with companies licensed and authorized to do business in the State of New York, the types of insurance set forth therein, when required by and in the amounts set forth in Schedule A of the General Conditions. Such required insurance must be provided from the date the contractor is ordered to commence work and up to the date of final acceptance of all required work.

(B) The contractor must, within ten days of receipt of the notice of award, submit the following insurance documentation: (a) original certificate of insurance for general liability in the amount required by Schedule A of the General Conditions, and (b) original certificates of insurance or other proof of coverage for workers' compensation and disability benefits, as required by Section 57 of the New York State Workers' Compensation Law and Section 220 of the Disability Benefits Law.

32. Lump Sum Contracts

(A) Comparison of Bids: Bids on Lump Sum Contracts will be compared on the basis of the lump sum price bid, adjusted for alternate prices bid, if any.

(B) Lump Sum Bids for "General Construction Work" which include excavation shall include all necessary excavation work defined in the Specifications as being included in the lump sum bid. The bidder shall also bid a unit price for the additional cost of excavating material which is defined in the Specifications as excavation for which additional payment will be made. The total estimated additional cost of removing such material will be taken as the quantity set forth in the Engineer's Estimate multiplied by the unit price bid. This total estimated cost of additional excavation shall be added to the lump sum bid for the General Construction Work for the purpose of comparing bids to determine the low bidder.

(C) Variations from Engineer's Estimate: The Engineer's Estimate of the quantity of excavation for which additional payment will be made is approximate only and is given solely to be used as a uniform basis for the comparison of bids and such estimate is not to be considered as part of this contract. The quantities actually required to complete the contract work may be more or less than the quantities in the Engineer's Estimate and, if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

33. Unit Price Contracts

(A) Comparison of Bids: Bids on Unit Price Contracts will be compared on the basis of a total estimated price, arrived at by taking the sum of the estimated quantities of such items, in accordance with the Engineer's Estimate of Quantities set forth in the Bid Form, multiplied by the corresponding unit prices, and including any lump sum bids on individual items.

(B) Variations from Engineer's Estimate: Bidders are warned that the Engineer's Estimate of Quantities on the various items of work and materials is approximate only, given solely to be used as a uniform basis for the comparison of bids, and is not to be considered part of this contract. The quantities actually required to complete the contract work may be less or more than so estimated, and if so, no action for damages or for loss of profits shall accrue to the contractor by reason thereof.

(C) Overruns: The terms and conditions applicable to overruns of unit price items are set forth in Article 26 of the Contract.

34. Excise Tax

Bidders are referred to the Specifications for information on Federal Excise Tax exemptions.

35. Licenses and Permits

The successful bidder will be required to obtain all necessary licenses and permits necessary to perform the work.

36. Multiple Prime Contractors

If more than one prime contractor will be involved on this project, all contractors are required to examine the Invitation for Bid packages for all other parts of the project.

37. Locally Based Enterprise Requirements (LBE)

This Contract is subject to the requirements of Administrative Code, Section 6-108.1, and the regulations promulgated thereunder. No construction contract will be awarded unless and until these requirements have been complied with in their entirety. The bidder is advised of the provisions set forth below, as well as the provisions with respect to the Locally Based Enterprise Program contained in Article 67 of the Contract. The contractor is advised that:

(A) If any portion of the Contract is subcontracted, not less than ten percent of the total dollar amount of the contract shall be awarded to locally based enterprises ("LBEs"); except, where less than ten percent of the total dollar amount of the Contract is subcontracted, such lesser percentage shall be so awarded.

(B) No contractor shall require performance and payment bonds from LBE subcontractors.

(C) No Contract shall be awarded unless the contractor first identifies in its bid:

- (1) the percentage, dollar amount and type of work to be subcontracted; and
- (2) the percentage, dollar amount and type of work to be subcontracted to LBEs.

(D) Within ten calendar days after notification of low bid, the apparent low bidder shall submit an "LBE Participation Schedule" to the contracting agency. If such schedule does not identify sufficient LBE subcontractors to meet the requirements of Administrative Code Section 6-108.1, the apparent low bidder shall submit documentation of its good faith efforts to meet such requirements.

(1) The "LBE Participation Schedule" shall include:

- (a) the name and address of each LBE that will be given a subcontract,
- (b) the percentage, dollar amount and type of work to be subcontracted to the LBE, and
- (c) the dates when the LBE subcontract work will commence and end.

- (2) The following documents shall be attached to the "LBE Participation Schedule":
- (a) verification letters from each subcontractor listed in the "LBE Participation Schedule" stating that the LBE will enter into a formal agreement for work,
  - (b) certification documents of any proposed LBE subcontractor which is not on the LBE certified list, and
  - (c) copies of the certification letter of any proposed subcontractor which is an LBE.
- (3) Documentation of good faith efforts to achieve the required LBE percentage shall include as appropriate but not limited to the following:
- (a) attendance at prebid meetings, when scheduled by the agency, to advise bidders of contract requirements;
  - (b) advertisement where appropriate in general circulation media, trade association publications and small business media of the specific subcontracts that would be at least equal to the percentage goal for LBE utilization specified by the contractor;
  - (c) written notification to association of small, minority and women contractors soliciting specific subcontractors;
  - (d) written notification by certified mail to LBE firms that their interest in the contract is solicited for specific work items and their estimated values;
  - (e) demonstration of efforts made to select portions of the work for performance by LBE firms in order to increase the likelihood of achieving the stated goal;
  - (f) documented efforts to negotiate with LBE firms for specific subcontracts, including at a minimum:
    - (i) The names, address and telephone numbers of LBE firms that are contacted;
    - (ii) A description of the information provided to LBE firms regarding the plans and specifications for portions of the work to be performed;
    - (iii) Documentation showing that no reasonable price can be obtained from LBE firms;
    - (iv) A statement of why agreements with LBE firms were not reached;
  - (g) a statement of the reason for rejecting any LBE firm which the contractor deemed to be unqualified; and
  - (h) documentation of efforts made to assist the LBE firms contacted that needed assistance in obtaining required insurance.

(E) Unless otherwise waived by the Commissioner with the approval of the Office of Economic and Financial Opportunity, failure of a proposed contractor to provide the information required by paragraphs (C) and (D) above may render the bid non-responsive and the Contract may not be awarded to the bidder. If the contractor states that it will subcontract a specific portion of the work, but can demonstrate despite good faith efforts it cannot achieve its required LBE percentage for subcontracted work until after award of Contract, the Contract may be awarded, subject to a letter of compliance from the contractor stating that it will comply with Administrative Code Section 6-108.1 and subject to approval by the Commissioner. If the contractor has not met its required LBE percentage prior to award, the contractor shall demonstrate that a good faith effort has been made subsequent to award to obtain LBEs on each subcontract until it meets the required percentage.

(F) When a bidder indicates prior to award that no work will be subcontracted, no work may be subcontracted without the prior written approval of the Commissioner, which shall be granted only if the contractor in good faith seeks LBE subcontractors at least six weeks prior to the start of work.

(G) The contractor may not substitute or change any LBE which was identified prior to award of the contract without the written permission of the Commissioner. The contractor shall make a written application to the Commissioner for permission to make such substitution or change, explaining why the contractor needs to change its LBE subcontractor and how the contractor will meet its LBE subcontracting requirement. Copies of such application must be served on the originally identified LBE by certified mail return receipt requested, as well as the proposed substitute LBE. The Commissioner shall determine whether or not to grant the contractor's request for substitution.

38. Bid Submission Requirements

The Bid Submission Requirements are set forth on page 2 of the Bid Booklet.

39. Comptroller's Certificate

This Contract shall not be binding or of any force unless it is registered by the Comptroller in accordance with Section 328 of the City Charter and the Procurement Policy Board Rules. This Contract shall continue in force only after annual appropriation of funds by the City of New York and certification as hereinabove set forth.

40. Procurement Policy Board Rules

This Invitation For Bids is subject to the Rules of the Procurement Policy Board of the City of New York. In the event of a conflict between said Rules and a provision of this Invitation For Bids, the Rules shall take precedence.

41. DDC Safety Requirements

The DDC Safety Requirements apply to the work to be performed pursuant to the Contract. The DDC Safety Requirements are set forth on the following pages.

**CITY OF NEW YORK**  
**DEPARTMENT OF DESIGN AND CONSTRUCTION**  
**SAFETY REQUIREMENTS**

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**THE DDC SAFETY REQUIREMENTS INCLUDE THE FOLLOWING SECTIONS:**

- I. POLICY ON SITE SAFETY**
- II. PURPOSE**
- III. DEFINITIONS**
- IV. RESPONSIBILITIES**
- V. SAFETY QUESTIONNAIRE**
- VI. SAFETY PROGRAM AND SITE SAFETY PLAN**
- VII. KICK-OFF/PRE-CONSTRUCTION MEETINGS AND SAFETY REVIEW**
- VIII. EVALUATION DURING WORK IN PROGRESS**
- IX. SAFETY PERFORMANCE EVALUATION**

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## I. POLICY ON SITE SAFETY

The City of New York Department of Design and Construction (DDC) is committed to a policy of injury and illness prevention and risk management for construction work that will ensure the safety and health of the workers engaged in the projects and the protection of the general public. Therefore, it is DDC's policy that work carried out by Contractors on DDC jobsites must, at a minimum, comply with applicable federal, state and city laws, rules and regulations, including without limitation:

- U. S. Department of Labor 29 Code of Federal Regulations (CFR) Part 1926 and applicable Sub-parts of Part 1910 – U.S. Occupational Safety and Health Administration (OSHA) including, but not limited to “Respiratory Protection” (29 CFR 1910.134), “Permit-Required Confined Spaces” (29 CFR 1910.146), and “Hazard Communication” (29 CFR 1910.1200);
- New York State Department of Labor Industrial Code Rule 23 – Protection in Construction, Demolition and Excavation;
- New York City Construction Codes, Title 28
- NYC Department of Transportation Title 34 Chapter 2 – Highway Rules
- New York State Department of Labor Industrial Code Rule 753
- NYC Local Law No. 113 (2005) Noise Control Code

In addition, all regulations promulgated by the NYC Department of Transportation, including requirements for Maintenance and Protection of Traffic (MPT), are applicable when contained in contract specifications. While MPT is a significant component of work in our Infrastructure Division, it does not supersede or exempt Contractors from complying with other applicable health and safety standards (for example, excavating and trenching standards, operation of heavy equipment and compliance with City environmental and noise regulations).

## I. PURPOSE

The purpose of this policy is to ensure that Contractors perform their work and supervise their employees in accordance with all applicable federal, state and city rules and regulations. Further, Contractors will be expected to minimize or eliminate jobsite and public hazard, through a planning, inspection, auditing and corrective action process. The goal is to control risks so that injuries, illnesses and accidents to contractors' employees, DDC employees and the general public, as well as damage to city-owned and private property, are reduced to the lowest level feasible.

## III. DEFINITIONS

**Agency Chief Contracting Officer (ACCO):** The ACCO shall mean the person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the CCPO.

**Competent Person:** As defined by OSHA, an individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees or the general public, and who has authorization to take prompt corrective measures to eliminate them.

**Construction Safety Auditor:** A representative of the QACS Construction Safety Unit who provides inspection and assessment services to enhance health and safety on all DDC construction projects. The activities of the Construction Safety Auditor include performing site surveys, reviewing health and safety plans, reviewing construction permits, and rendering technical advice and assistance to DDC Resident Engineers and Project Managers.

**Construction Safety Unit:** A part of QACS within the Division of Technical Support that assesses contractor safety on DDC jobsites and advises responsible parties of needed corrective actions.

**Construction Superintendent:** A representative of the contractor responsible for overseeing performance of the required construction work. This individual must engage in sound construction practices, and is responsible to maintain a safe work site. In the case of a project involving the demolition, alteration or new construction of buildings, the Construction Superintendent must be licensed by the NYC Department of Buildings.

**Contractor:** For purposes of these Safety Requirements, the term "Contractor" shall mean any person or entity that enters into a contract for the performance of construction work on a DDC project. The term "Contractor" shall include any person or entity which enters into any of the following types of contracts: (1) a prime construction contract for a specific project, (2) a prime construction contract using the Job Order Contracting System ("JOCS Contract"), and (3) a subcontract with a CM/Builder ("First Tier Subcontract").

**Director - Quality Assurance and Construction Safety (QACS):** Responsible for the operations of the QACS Construction Safety Unit and the DDC Site Safety management programs.

**Job Hazard Assessment (JHA):** A process of identifying site-specific hazards that may be present during construction and establishing the means and methods to reduce or eliminate those hazards.

**Jobsite Safety Coordinator:** A person designated by the Contractor to be onsite during all activities. This individual shall have received, at a minimum, the OSHA 10-hour construction safety program. Other examples of acceptable training are the 30-hour OSHA Safety and Health Standards for the Construction Industry training program (OSHA 510) or a degree/certificate in a safety and health from a college-level curriculum. This person does not necessarily have to be dedicated full-time to site safety, but must have sufficient experience and authority to undertake corrective action and must qualify to be a competent person. For certain projects, as defined in NYC Construction Codes – Title 28, this person may be required to have a Site Safety Manager's License issued by the NYC DOB.

**Qualified Person:** As defined by OSHA, an individual who, by possession of a recognized degree, certificate, license or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve problems relating to the subject matter, the work, or the project. Qualified Persons are required under regulation to address issues pertaining, but without limit, to fall protection, scaffold design and trenching and shoring, among others.

**Resident Engineer (RE) / Construction Project Manager (CPM):** Representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the work. (The RE/CPM may be a third-party consultant, including a CM, retained by DDC.)

**Safety Program:** Established by the Contractor that covers all operations of that Contractor and establishes the Contractor's overall safety policy, regulatory compliance plan and minimum safety standards. The Safety Program must be submitted prior to the commencement of work at the site and is subject to review and acceptance by the Construction Safety Unit.

**Safety Questionnaire:** Used by DDC to evaluate Contractor's current and past safety performance. It is required to be completed by all Contractors initially when submitting bids for Construction work, or when being pre-qualified and updated annually or as requested by the DDC.

**Site Safety Plan:** A site-specific safety plan developed by the Contractor for a specific project. The Site Safety Plan must identify hazards associated with the project, and include specific safety precautions and training appropriate and necessary to complete the work. The Site Safety Plan must be submitted prior to the commencement of work at the site and is subject to review and acceptance by the Construction Safety Unit.

**Unsafe or Unhealthy Condition:** A condition that could be potentially hazardous to the health and safety of personnel or the public, and/or damaging to equipment, machinery, property or the environment.

**Weekly Safety Meetings:** Weekly documented jobsite safety meetings, given to all jobsite personnel by contractor, with the purpose of discussing general safety topics and job specific requirements encountered at the DDC work site.

#### **IV. RESPONSIBILITIES**

All persons who manage, perform, and provide support for construction projects shall conduct operations in compliance with the requirements identified in this Policy and all applicable governing regulatory agency requirements and guidelines pertaining to safety in construction.

##### **A. Resident Engineer / Construction Project Manager / Construction Manager**

- Monitors the issuance of safety-related permits, approvals and drawings and maintains copies on site.
- Monitors construction-related work activities to confirm that they are conducted in accordance with DDC policies and all applicable regulations that pertain to construction safety.
- Maintains documentation and periodically attends weekly safety meeting.
- Notifies the Construction Safety Unit and the ACCO's Insurance and Risk Management Unit of project-related accidents and emergencies, as per DDC's Construction Safety Emergency Protocol.
- Gathers facts related to all accidents and prepares DDC Accident Reports.
- Notifies the Construction Safety Unit of outside regulatory agency inspections and forwards a copy of the inspection report within three days of its receipt.
- Monitors the conditions at the site for conformance with the Site Safety Plan and DDC construction documents.
- Notifies the contractor and DDC in the event that any condition or activity exists that is not in compliance with the Site Safety Plan, applicable federal, state or local codes or any condition that presents a potential risk of injury to the public or workers or possible damage to property.
- Notifies DDC of any emergency condition and directs the contractor to provide such labor, materials, equipment and supervision to abate such conditions.
- Reports gross safety violations to the Construction Safety Unit immediately.

##### **A. Contractors**

- Complete a Safety Questionnaire and submit with its bid or as part of a pre-qualification package.
- Provide a Written Job Hazard Assessment (JHA) that identifies expected safety issues of the work to be performed. JHA shall be included with the Site Safety Plan submitted by the contractor.
- Submit a Site Safety Plan and Safety Program within 15 days of issuance of the Notice to Proceed, or as otherwise directed. The Site Safety Plan and Safety Program are subject to review and acceptance by the Construction Safety Unit prior to the commencement of work at the site. The Site Safety Plan shall be revised and updated as necessary.
- Ensure that all employees are aware of the hazards associated with the project through formal and informal training and/or other communications. Conduct and document weekly safety meetings for the duration of the project. Documentation to be provided to the RE/CPM/CM on a monthly basis.
- Name a Construction Superintendent, if required.
- Name a Job Site Safety Coordinator. The Contractor will be required to identify the Job Site Safety Coordinator in the Site Safety Plan.
- Comply with all mandated federal, state and local safety and health rules and regulations.
- Comply with all provisions of the Site Safety Plan.
- As part of the Site Safety Plan, prepare a site specific MPT (if not otherwise provided in the contract documents) and comply with all of its provisions.
- Conduct and document site-specific safety orientation for Contractor personnel to review the hazards associated with the project as identified in the Site Safety Plan and the specific safety procedures and controls that will be used to protect workers, the general public and property. The Job Site Safety Coordinator will conduct this training prior to mobilization and provide documentation to the RE/CPM/CM.
- Provide, replace and adequately maintain at or around the project site, suitable and sufficient signage, lights, barricades and enclosures (fences, sidewalk sheds, netting, bracing, etc.).
- Report unsafe conditions or hazards to the DDC RE/CPM/CM as soon as practical, but no more than 24 hours after discovery, and take action to remove or abate such conditions.

- Report any accident involving injuries to workers or the general public, as well as property damage, to the DDC RE/CPM/CM within two (2) hours.
- Notify the DDC RE/CPM/CM within two (2) hours of the start of an inspection by any regulatory agency personnel, including OSHA.
- Maintain all records pertaining to all required compliance documents and accident and injury reports.
- Respond to DDC recommendations on safety, which shall in no way relieve the Contractor of its responsibilities for safety on the project. The Contractor has sole responsibility for safety.

## V. SAFETY QUESTIONNAIRE

DDC requires that all Contractors provide information regarding their current and past safety and environmental performance and programs. This will be accomplished by the use of the DDC Safety Questionnaire. As a part of the bid submittal package, the contractor must submit a completed DDC Safety Questionnaire listing their workers' compensation experience modification rating and OSHA Incidence Rates for the three (3) years prior to the date of the bid opening. DDC may request a Contractor to update its Questionnaire at any time or to provide more detailed information. The Contractor must provide the requested update within 30 days.

The following criteria will be used by DDC in reviewing the Contractor's responsibility, which will be based on the information provided on the questionnaire:

- Criteria 1: OSHA Injury and Illness Rates (I&IR) are no greater than the average for the industry (based on the most current Bureau of Labor Statistics data for the Contractors SIC code); and
- Criteria 2: Insurance workers compensation Experience Modification Rate (EMR) equal to or less than 1.0; and
- Criteria 3: Any willful violations issued by OSHA or NYC DOB within the last three years; and
- Criteria 4: A fatality (worker or member of public) experienced on or near Contractor's worksite within the last three (3) years; and
- Criteria 5: An unacceptable rating by QACS based on past performance on DDC projects; and
- Criteria 6: Contractor has in place an acceptable corporate safety program and its employees shall have completed all documented relative safety training; and
- Criteria 7: Contractor shall provide OSHA Injury Records (currently OSHA 300 Log) for the last three (3) years.

If the Contractor fails to meet the basic criteria listed above, the Construction Safety Unit may request, through the ACCO, more detail concerning the Contractor's safety experience. DDC may request the Contractor to provide copies of, among other things, OSHA records, OSHA and DOB citations, EPA citations and written Safety Programs.

## VI. SAFETY PROGRAM AND SITE SAFETY PLAN

Within fifteen (15) days of issuance of the Notice to Proceed, or as otherwise directed, the Contractor shall submit the following: (1) Safety Program, and (2) Site Safety Plan. The Safety Program shall set forth the Contractor's overall safety policy, regulatory compliance plan and minimum safety standard, and the Site Safety Plan shall identify hazards associated with the project, and include specific safety precautions and training appropriate and necessary to complete the work. The Safety Program and the Site Safety Plan are subject to review and acceptance by the Construction Safety Unit prior to the commencement of work at the site. Failure by the contractor to submit an acceptable Site Safety Plan and Safety Program shall be grounds for default.

The Site Safety Plan shall apply to all Contractor and subcontractor operations, and shall have at a minimum, the following elements. Each element shall be described in a separate section in the written document. It may be necessary to modify the basic format for certain unique or high-risk projects (such as tunnels or high-rise construction). The basic elements are as follows:

1. **Responsibility and Organization:** Identify the person or persons with authority and responsibility for implementing the Site Safety Plan. Provide an organization chart and define levels of authority and responsibility. Identify the Competent Person, the Construction Superintendent (if required), the Job Safety Coordinator and the Qualified Person required for this project.
2. **Communication:** Establish a system for communicating with employees and subcontractors on matters relating to worker and public safety and health and environmental protection, including provisions designed to encourage employees to inform the employer of hazards at the worksite without fear of reprisal. An emergency response notification protocol is to be established that also includes after hours contact numbers. The plan must also include provisions for weekly safety meetings held by the Job Site Safety Coordinator.
3. **Job Hazard Assessment:** A written document submitted by the contractor, used to identify expected job hazards and public safety risks and state the specific means and methods to reduce, control or eliminate those hazards. This part of the Site Safety Plan must also include how on-going evaluations of those risks and hazards will be carried out, including plans for periodic inspections to identify unsafe conditions, work practices and public safety hazards.
4. **Accident/Exposure Investigation:** Establish a procedure to investigate and report occupational and public injury or illness, property damage, vehicle accidents or other mishaps.
5. **Hazard Correction:** Establish means, methods and/or procedures for correcting unsafe or unhealthy conditions that might be exposing both the public and workers to hazards. Corrective actions must be taken immediately when observed or discovered. Should an imminent hazard exist which cannot be immediately abated without endangering employees, the public and/or property, remove or restrict all exposed persons from the area except those necessary to correct the existing condition. Employees necessary to correct the hazardous condition shall be provided the necessary safeguards. When corrective actions cannot be taken immediately, temporary measures should be taken until such time permanent measures are taken to eliminate the potential risks or hazards
6. **Training:** Describe site-specific hazard training programs. In addition to the required safety orientation, additional site specific training, in the form of required weekly safety meetings, will be required. Contractors must also initiate training when: a) new employees are hired; b) employees are given new job assignments for which training has not been previously received; c) new substances, processes, procedures or equipment are introduced that might represent a new public or worker hazard; d) the employee is made aware of a new or previously unrecognized hazard; e) new supervisors are assigned to familiarize themselves with the safety and health hazards to which employees under their immediate direction and control may be exposed; and f) after a jobsite incident or accident has occurred.
7. **Recordkeeping:** Establish procedures to maintain records of scheduled and periodic inspections, weekly safety meetings, and training records. Updated records shall be maintained at the jobsite, accessible to the Construction Safety Auditors and/or Quality Assurance Auditors/RE/CPM, and retained in accordance with DDC policy.

The most critical component of the Site Safety Plan is the Job Hazard Assessment section. This section must address specific hazards that are anticipated throughout the project. Each Site Safety Plan must address, at a minimum:

- Public and pedestrian safety
- Fall protection
- Electrical hazards
- Scaffolding
- Fire protection
- Emergency notification & response
- Housekeeping / debris removal
- Dust control
- Maintenance and protection of traffic
- Trenching and excavating
- Heavy equipment operations
- Material / equipment storage
- Environmental contamination
- Sheeting and shoring
- Alcohol and Drug Abuse Policy

The following additional hazards must be addressed, if applicable, based on the contract safety specifications and/or the results of the JHA (the list is not all-inclusive):

- Basic Personal Protective Equipment
- Compressed Air
- Compressed Gas Cylinders
- Cranes, Derricks and Hoists
- Demolition
- Electrical safety
- Excavations and Trenching
- Fall Protection – Floor openings/Stairways
- Fall Protection – Guardrails Toe boards etc
- Fall Protection – Leading Edge
- Fall Protection – Personal Fall Protection Devices
- Fire Protection and Fire Prevention
- Hazard Communication (RIGHT TO KNOW)
- Hazardous Energy & Lock Out / Tag Out
- Housekeeping/ Sanitation
- Maintenance and Protection of Traffic (MPT)
- Man Lifts /Aerial Lifts
- Marine Operations
- Motor Vehicle Safety
- Overhead Power lines
- Permit Required Confined Space
- Portable Ladders
- Powered Actuated Tools
- Powered Material Handling Equipment
- Scaffolds – Mobile
- Scaffolds – Stationary
- Scaffolds – Suspended
- Slings
- Steel Erection
- Welding and Cutting (Hot Work)
- Airborne Contaminants – Particulates – General
- Asbestos
- Blood borne Pathogens
- Hearing Protection
- Lead in Construction
- Mercury in Construction
- PCB's
- Respiratory Protection
- Silica
- Thermal Stress
- West Nile Virus
- Rodents and Vermin
- Noise Mitigation Plan

Certain DDC programs, such as Job Order Contracting System (JOCS), may not necessarily require Site Safety Plans. The JOCS contractor will be required to submit a Safety Program. In addition, certain DDC Operating Units may establish program or client-specific safety requirements. The contractor's Site Safety Plan must address such program or client specific safety requirements.

## **VII. KICK-OFF MEETINGS/PRE-CONSTRUCTION AND SAFETY REVIEW**

As part of the construction kick-off meeting, a Site Safety Plan review will be part of the agenda. A QACS representative will participate in this meeting with the contractor prior to the start of the project for the purpose of:

- A. Reviewing the safety issues detailed in the contract.
- B. Reviewing the Site Safety Plan.
- C. Reviewing any new issues or information that was not previously addressed.
- D. Discussing planned inspections and audits of the site by DDC personnel.

## **VIII. EVALUATION DURING WORK IN PROGRESS**

The Contractor's adherence to these Safety Requirements will be monitored throughout the project. This will be accomplished by the following:

- A. Use of a safety checklist by a representative of the Construction Safety Unit or other designated DDC representative or Consultant during regular, unannounced inspections of the job site. Field Exit Conferences will be held with the RE/CPM, Contractor Superintendents or Safety Representatives.
- B. The RE/CPM will continually monitor the safety and environmental performance of the contractor's employees and work methods. Deficiencies shall be brought to the attention of the contractor's representative on site for immediate correction. The DDC representative will maintain a written record of these deficiencies and forward them to the Construction Safety Unit on a weekly basis. Any critical deficiencies shall be immediately reported to QACS phone# (718) 391-1624 or (718) 391-1911.
- C. If the Contractor's safety performance during the project is not up to DDC standards (safety performance measure, accident/incident rate, etc.) the Director- QACS, or designee will meet with the Contractor's safety representative, the DDC project manager, the RE/CPM, or the DDC Environmental Specialist (if environmental issues are involved ). The purpose of this meeting is to 1) determine the level of non-compliance; 2) explain and clarify the safety/environmental provisions; 3) agree on a future course of action to correct the deficiencies.
- D. If the deficiencies continue to occur with inadequate attention by the contractor, this shall, among other remedies available, be grounds for default.
- E. The contractor shall inform the Construction Safety Unit and ACCO Insurance and Risk Management Unit of all medical injuries or illnesses that require doctors' treatment resulting from an on-the-job incident within 24 hours of the occurrence. The Construction Safety Unit shall also be immediately informed of all fatalities, catastrophic accidents with more than one employee hospitalized, any injuries to members of the general public and major equipment damage (e.g., property damage, equipment rollovers, loads dropped from crane). QACS shall maintain a record of all contractor injuries and illnesses during the project and provide regular reports to the Agency.
- F. The Construction Safety Unit shall be immediately notified at the start of any NYS-DOL/ NYC-COSH/ OSHA/ EPA inspections. The Director of Quality Assurance & Construction Safety shall maintain a log of all contractor OSHA/EPA inspections and citations during the project.

## **IX. SAFETY PERFORMANCE EVALUATION**

The contractor's safety record, including all DDC inspection results, will be considered as part of the Contractor's performance evaluation at the conclusion of the project. Poor safety performance during the course of the project shall be a reason to rate a Contractor unsatisfactory which will be reflected in the City's Vendex system and will be considered for future procurement actions as set forth in the City's Procurement Policy Board Rules.

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**CITY OF NEW YORK**  
**STANDARD CONSTRUCTION CONTRACT**  
**DELAY DAMAGES PILOT**

**September 2008**

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STANDARD CONSTRUCTION CONTRACT**

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CITY OF NEW YORK

STANDARD CONSTRUCTION CONTRACT (September 2008)

The Standard Construction Contract dated September 2008 (the "Contract") is amended as set forth below.

- Article 77: Article 77, Part A, Section 5 is deleted in its entirety and replaced with the following:

5. Where a Subcontractor Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multi-year contracts, such list shall also be submitted every year thereafter. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5), [i.e., a contract valued at or below \$3M (for projects in New York City) or a contract that is subject to a Project Labor Agreement] where the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades [i.e., plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring], the Contractor must identify all those to which it intends to award construction subcontracts for any of the Wicks trades, regardless of what point in the life of the contract such subcontracts will occur, at the time of bid submission. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.**

- Article 77: Article 77, Part A, Section 11 is deleted in its entirety and replaced with the following:

11. **Modification of Subcontractor Utilization Plan.** A Contractor may request a modification of its Subcontractor Utilization Plan (**Subcontractor Participation Goals**) after award of this Contract. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5), [i.e., a contract valued at or below \$3M (for projects in New York City) or a contract that is subject to a Project Labor Agreement] where the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades [i.e., plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring], the Contractor may request a Modification of its Subcontractor Utilization Plan as part of its bid submission. The Agency may grant a request for Modification of a Contractor's Subcontractor Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the Subcontractor Participation Goals. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:**

Sub-paragraphs (a) through (h) remain unchanged.

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**WITNESSETH:**

The parties in consideration of the mutual agreements contained herein, agree as follows:

**CHAPTER I  
THE CONTRACT AND DEFINITIONS**

**ARTICLE 1. THE CONTRACT**

1.1 Except for titles, subtitles, headings, running headlines, tables of content and indices (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, shall be deemed to be part of this Contract:

1.1.1 All provisions required by law to be inserted in this Contract, whether actually inserted or not;

1.1.2 The Contract Drawings and Specifications;

1.1.3 The General Conditions and Special Conditions, if any;

1.1.4 The Contract;

1.1.5 The Information for Bidders; Request for Proposals; Notice of Solicitation and Proposal For Bids; Bid or Proposal, and, if used, the Bid Booklet;

1.1.6 The Budget Director's Certificate; all Addenda issued prior to the receipt of the bids; the Notice of Award; Performance and Payment Bonds, if required; and the Notice to Proceed with the Work.

1.2 Should any conflict occur in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated the most expensive way of doing the Work, unless the Contractor shall have asked for and obtained a decision in writing from the Commissioner, of the Agency that is entering into this Contract, before the submission of its bid as to what shall govern.

**ARTICLE 2. DEFINITIONS**

2.1 The following words and expressions, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless a different meaning is clear from the context:

2.1.1 "**Addendum**" or "**Addenda**" shall mean the additional Contract provisions issued in writing by the Commissioner prior to the receipt of bids.

2.1.2 "**Agency**" shall mean a city, county, borough or other office, position, department, division, bureau, board or commission, or a corporation, institution or agency of government, the expenses of which are paid in whole or in part from the City treasury.

2.1.3 "**Agency Chief Contracting Officer**" (**ACCO**) shall mean a person delegated authority by the Commissioner to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the CCPO.

2.1.4 "**City**" shall mean the City of New York.

2.1.5 "**City Chief Procurement Officer**" (CCPO) shall mean a person delegated authority by the Mayor to coordinate and oversee the procurement activity of Mayoral agency staff, including the ACCO and any offices which have oversight responsibility for the procurement of construction.

2.1.6 "**Commissioner**" shall mean the head of the Agency that has entered into this Contract, or his/her duly authorized representative.

2.1.7 "**Comptroller**" shall mean the Comptroller of the City of New York.

2.1.8 "**Contract**" or "**Contract Documents**" shall mean each of the various parts of the contract referred to in Article 1 hereof, both as a whole and severally.

2.1.9 "**Contract Drawings**" shall mean only those drawings specifically entitled as such and listed in the Specifications or in any Addendum, or any drawings furnished by the Commissioner, pertaining or supplemental thereto.

2.1.10 "**Contract Work**" shall mean everything required to be furnished and done by the Contractor by any one or more of the parts of the Contract referred to in Article 1, except Extra Work as hereinafter defined.

2.1.11 "**Contractor**" shall mean the entity which executed this Contract, whether a corporation, firm, partnership, joint venture, individual, or any combination thereof, and it(s), their, his/ her successors, personal representatives, executors, administrators and assigns, and any person, firm, partnership, joint venture, individual, or corporation which shall at any time be substituted in the place of the Contractor under this Contract.

2.1.12 "**Days**" shall mean calendar days, except where otherwise specified.

2.1.13 "**Engineer**" or "**Architect**" or "**Project Manager**" shall mean the person so designated in writing by the Commissioner to act as such in relation to this Contract, including a private Architect or Engineer or Project Manager, as the case may be.

2.1.14 "**Engineering Audit Officer**" (EAO) shall mean the person so designated by the Commissioner to perform responsible auditing functions hereunder.

2.1.15 "**Extra Work**" shall mean Work other than that required by the Contract at the time of award which is authorized by the Commissioner pursuant to Chapter VI of this Contract.

2.1.16 "**Federal-Aid Contract**" shall mean a contract in which the United States (federal) Government provides financial funding as so designated in the Information for Bidders.

2.1.17 "**Final Acceptance**" shall mean final written acceptance of all the Work by the Commissioner, a copy of which shall be sent to the Contractor.

2.1.18 "**Final Approved Punch List**" shall mean a list, approved in writing by the Engineer, specifying those items of Work to be completed by the Contractor after Substantial Completion and dates for the completion of each item of Work.

2.1.19 "**Law**" or "**Laws**" shall mean the Constitution of the State of New York, the New York City Charter, the New York City Administrative Code, a Statute of the United States or

of the State of New York, a local law of the City of New York, any ordinance, rule or regulation having the force of law, or common law.

2.1.20 **"Materialman"** shall mean any corporation, firm, partnership, joint venture, or individual, other than employees of the Contractor, who or which contracts with the Contractor or any Subcontractor, to fabricate or deliver, or who actually fabricates or delivers, plant, materials or equipment to be incorporated in the Work.

2.1.21 **"Means and Methods of Construction"** shall mean the labor, materials, temporary structures, tools, plant, and construction equipment, and the manner and time of their use, necessary to accomplish the result intended by this Contract.

2.1.22 **"Other Contractor(s)"** shall mean any Contractor (other than the entity which executed this Contract or its Subcontractors) who has a contract with the City for work on or adjacent to the building or site of the Work.

2.1.23 **"Payroll Taxes"** shall mean State Unemployment Insurance ("SUI"), Federal Unemployment Insurance (FUI) and payments pursuant to the Federal Insurance Contributions Act ("FICA").

2.1.24 **"Project"** shall mean the public improvement to which this Contract relates.

2.1.25 **"Procurement Policy Board" (PPB)** shall mean the Agency of the City of New York whose function is to establish comprehensive and consistent procurement policies and rules which shall have broad application throughout the City.

2.1.26 **"Required Quantity"** in a unit price Contract shall mean the actual quantity of any item of Work or materials which is required to be performed or furnished in order to comply with the Contract.

2.1.27 **"Resident Engineer"** shall mean the representative of the Commissioner duly designated by the Commissioner to be his/her representative at the site of the Work.

2.1.28 **"Site"** shall mean the area upon or in which the Contractor's operations are carried on, and such other areas adjacent thereto as may be designated as such by the Engineer.

2.1.29 **"Specifications"** shall mean all of the directions, requirements and standards of performance applying to the Work as hereinafter detailed and designated under the Specifications.

2.1.30 **"Subcontractor"** shall mean any person, firm or corporation, other than employees of the Contractor, who or which contracts with the Contractor or with its Subcontractors to furnish, or actually furnishes labor, or labor and materials, or labor and equipment, at the site. Wherever the word Subcontractor appears, it shall also mean Sub-Subcontractor.

2.1.31 **"Substantial Completion"** shall mean the written determination by the Commissioner that the Work required under this Contract is substantially, but not entirely, complete.

2.1.32 **"Treasurer"** shall mean the Commissioner of the Department of Finance of the City of New York.

2.1.33 "**Work**" shall mean all services required to complete the Project in accordance with the Contract Documents, including without limitation, labor, material, superintendence, management, administration, equipment, and incidentals, and shall include both Contract Work and Extra Work.

## CHAPTER II THE WORK AND ITS PERFORMANCE

### ARTICLE 3. CHARACTER OF THE WORK

3.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications and Addenda**, the **Work** shall be performed in accordance with the best modern practice, utilizing, unless otherwise specified in writing, new and unused materials of standard first grade quality and workmanship and design of the highest quality, to the satisfaction of the **Commissioner**.

### ARTICLE 4. MEANS AND METHODS OF CONSTRUCTION

4.1 Unless otherwise expressly provided in the **Contract Drawings, Specifications and Addenda**, the **Means and Methods of Construction** shall be such as the **Contractor** may choose; subject, however, to the **Engineer's** right to reject the **Means and Methods of Construction** proposed by the **Contractor** which in the opinion of the **Engineer**:

- 4.1.1 Will constitute or create a hazard to the **Work**, or to persons or property; or
- 4.1.2 Will not produce finished **Work** in accordance with the terms of the **Contract**; or
- 4.1.3 Will be detrimental to the overall progress of the **Project**.

4.2 The **Engineer's** approval of the **Contractor's Means and Methods of Construction**, or his/her failure to exercise his/her right to reject such means or methods, shall not relieve the **Contractor** of its obligation to complete the **Work** as provided in this **Contract**; nor shall the exercise of such right to reject create a cause of action for damages.

### ARTICLE 5. COMPLIANCE WITH LAWS

5.1 The **Contractor** shall comply with all **Laws** applicable to this **Contract** and to the **Work** to be done hereunder.

5.2 Procurement Policy Board Rules: This **Contract** is subject to the Rules of the **PPB** ("**PPB Rules**") in effect at the time of the bid opening for this **Contract**. In the event of a conflict between the **PPB Rules** and a provision of this **Contract**, the **PPB Rules** shall take precedence.

5.3 Noise control code provisions.

5.3.1 In accordance with the provisions of Section 24-216(b) of the Administrative Code of the **City** ("**Administrative Code**"), Noise Abatement Contract Compliance, devices and activities which will be operated, conducted, constructed or manufactured pursuant to this **Contract** and which are subject to the provisions of the **City Noise Control Code** shall be operated, conducted, constructed, or manufactured without causing a violation of the **Administrative Code**. Such devices and activities shall incorporate advances in the art of noise control development for the kind and level of noise

emitted or produced by such devices and activities, in accordance with regulations issued by the **Commissioner** of the Department of Environmental Protection.

5.3.2 The Contractor agrees to comply with Section 24-219 of the Administrative Code of the City ("Administrative Code") and implementing rules codified at 15 Rules of the City of New York ("RCNY") Section 28-100 et. seq. In accordance with such provisions, the **Contractor**, if the Contractor is the responsible party under such regulations, shall prepare and post a Construction Noise Mitigation Plan at each work site, in which the **Contractor** shall certify that all construction tools and equipment have been maintained so that they operate at normal manufacturers operating specifications. If the **Contractor** cannot make this certification, it must have in place an Alternative Noise Mitigation Plan approved by the New York City Department of Environmental Protection. In addition, the Contractor's certified Construction Noise Mitigation Plan is subject inspection by the Department of Environmental Protection in accordance with 15 RCNY §28-101. No Contract work may take place at a worksite unless there is a Construction Noise Mitigation Plan or approved Alternative Noise Mitigation Plan in place. In addition, the **Contractor** shall create and implement a noise mitigation training program. Failure to comply with these requirements may result in fines and other penalties pursuant to the applicable provisions of the Administrative Code and RCNY.

5.4 Ultra Low Sulfur Diesel Fuel: In accordance with the provisions of Section 24-163.3 of the Administrative Code, the Contractor specifically agrees as follows:

5.4.1 Definitions. For purposes of this Article 5.4, the following definitions apply:

5.4.1(a) "Contractor" means any person or entity that enters into a Public Works Contract with a City agency, or any person or entity that enters into an agreement with such person or entity, to perform work or provide labor or services related to such Public Works Contract

5.4.1(b) "Motor Vehicle" means any self-propelled vehicle designed for transporting persons or property on a street or highway.

5.4.1(c) "Nonroad Engine" means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under section 7411 or section 7521 of title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.4.1(d) "Nonroad Vehicle" means a vehicle that is powered by a Nonroad Engine, fifty horsepower and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers and similar equipment, except that this term shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five horsepower or less and that are not used in any construction program or project.

5.4.1(e) "Public Works Contract" means a contract with a City agency for a construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; a contract with a City agency for the preparation for any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge; or a contract with a City agency for any final work involved in the completion of any construction program or project involving the construction, demolition, restoration, rehabilitation, repair, renovation, or abatement of any building, structure, tunnel, excavation, roadway, park or bridge.

5.4.1(f) "Ultra Low Sulfur Diesel Fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million.

#### 5.4.2 Ultra Low Sulfur Diesel Fuel

5.4.2(a) All Contractors shall use Ultra Low Sulfur Diesel Fuel in diesel-powered Nonroad Vehicles in the performance of this **Contract**.

5.4.2(b) Notwithstanding the requirements of Article 5.4.2(a), Contractors may use diesel fuel that has a sulfur content of no more than thirty parts per million to fulfill the requirements of this Article 5.4.2, where the Commissioner of the New York City Department of Environmental Protection ("DEP Commissioner") has issued a determination that a sufficient quantity of Ultra Low Sulfur Diesel Fuel is not available to meet the needs of City agencies and Contractors. Any such determination shall expire after six months unless renewed.

5.4.2(c) Contractors shall not be required to comply with this Article 5.4.2 where the agency letting this contract makes a written finding, which is approved, in writing, by the DEP Commissioner, that a sufficient quantity of Ultra Low Sulfur Diesel Fuel, or diesel fuel that has a sulfur content of no more than thirty parts per million is not available to meet the requirements of Section 24-163.3 of the Administrative Code, provided that such Contractor in its fulfillment of the requirements of this **Contract**, to the extent practicable, shall use whatever quantity of Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million is available. Any finding made pursuant to this subdivision shall expire after sixty days, at which time the requirements of this Article 5.4.2 shall be in full force and effect unless the Agency renews the finding in writing and such renewal is approved by the DEP Commissioner.

5.4.2(d) Contractors may check on determinations and approvals issued by the DEP Commissioner pursuant to Section 24-163.3 of the Administrative Code, if any, at [www.dep.nyc.gov](http://www.dep.nyc.gov) or by contacting the Agency issuing this solicitation.

5.4.2(e) The requirements of this Article 5.4.2 do not apply where they are precluded by federal or State funding requirements or where the **Contract** is an emergency procurement.

#### 5.4.3 Best Available Technology

5.4.3(a) All Contractors shall utilize the best available technology for reducing the emission of pollutants for diesel-powered Nonroad Vehicles in the performance of this **Contract**. For determinations of best available technology for each type of diesel-powered Nonroad Vehicle, Contractors shall comply with the regulations of the City Department of Environmental Protection, as and when adopted, Chapter 14 of Title 15 of the Rules of the City of New York (RCNY). The Contractor shall fully document all steps in the best available technology selection process and shall furnish such documentation to the Agency or the DEP Commissioner upon request. The Contractor shall retain all documentation generated in the best available technology selection process for as long as the selected best available technology is in use.

5.4.3(b) No Contractor shall be required to replace best available technology for reducing the emission of pollutants or other authorized technology utilized for a diesel-powered Nonroad Vehicle in accordance with the provisions of this Article 5.4.3 within three years of having first utilized such technology for such vehicle.

5.4.3(c) This Article 5.4.3 shall not apply to any vehicle used to satisfy the requirements of a specific Public Works Contract for fewer than twenty calendar days.

5.4.3(d) The Contractor shall not be required to comply with this Article 5.4.3 with respect to a diesel-powered Nonroad Vehicle under the following circumstances:

5.4.3(d)(1) Where the agency makes a written finding, which is approved, in writing, by the DEP Commissioner, that the best available technology for reducing the emission of pollutants as required by those paragraphs is unavailable for such vehicle, Contractor shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle.

5.4.3(d)(2) Where the DEP Commissioner has issued a written waiver based upon the Contractor having demonstrated to the DEP Commissioner that the use of the best available technology for reducing the emission of pollutants might endanger the operator of such vehicle or those working near such vehicle, due to engine malfunction, Contractor shall use whatever technology for reducing the emission of pollutants, if any, is available and appropriate for such vehicle, which would not endanger the operator of such vehicle or those working near such vehicle.

5.4.3(d)(3) In determining which technology to use for the purposes of Articles 5.4.3(d)(1) and 5.4.3(d)(2) above, Contractor shall primarily consider the reduction in emissions of particulate matter and secondarily consider the reduction in emissions of nitrogen oxides associated with the use of such technology, which shall in no event result in an increase in the emissions of either such pollutant.

5.4.3(d)(4) Contractors shall submit requests for a finding or a waiver pursuant to this Article 5.4.3(d) in writing to the DEP Commissioner, with a copy to the ACCO of the Agency issuing the solicitation. Any finding or waiver made or issued pursuant to Articles 5.4.3(d)(1) and 5.4.3(d)(2) above shall expire after one hundred eighty days, at which time the requirements of Article 5.4.3(a) shall be in full force and effect unless the Agency renews the finding, in writing, and the DEP Commissioner approves such finding, in writing, or the DEP Commissioner renews the waiver, in writing.

5.4.3(e) The requirements of this Article 5.4.3 do not apply where they are precluded by federal or State funding requirements or where the contract is an emergency procurement.

5.4.4 Section 24-163 of the Administrative Code. Contractors shall comply with Section 24-163 of the Administrative Code related to the idling of the engines of motor vehicles while parking.

#### 5.4.5 Compliance

5.4.5(a) Contractor's compliance with Article 5.4 may be independently monitored. If it is determined that the Contractor has failed to comply with any provision of Article 5.4, any costs associated with any independent monitoring incurred by the City shall be reimbursed by the Contractor.

5.4.5(b) Any Contractor who violates any provision of Article 5.4, except as provided in Article 5.4.5(c) below, shall be liable for a civil penalty between the amounts of one thousand and ten thousand dollars, in addition to twice the amount of money saved by such Contractor for failure to comply with Article 5.4.

5.4.5(c) No Contractor shall make a false claim with respect to the provisions of Article 5.4 to a City agency. Where a Contractor has been found to have done so, such Contractor shall be liable for a civil penalty of twenty thousand dollars, in addition to twice the amount of money saved by such Contractor in association with having made such false claim.

#### 5.4.6 Reporting

5.4.6(a) For all Public Works Contracts covered by this Article 5.4, the Contractor shall report to the Department the following information:

5.4.6(1) The total number of diesel-powered Nonroad Vehicles used to fulfill the requirements of this Public Works Contract;

5.4.6(2) The number of such Nonroad Vehicles that were powered by Ultra Low Sulfur Diesel Fuel;

5.4.6(3) The number of such Nonroad Vehicles that utilized the best available technology for reducing the emission of pollutants, including a breakdown by vehicle model and the type of technology;

5.4.6(4) The number of such Nonroad Vehicles that utilized such other authorized technology in accordance with Article 5.4.3, including a breakdown by vehicle model and the type of technology used for each such vehicle;

5.4.6(5) The locations where such Nonroad Vehicles were used; and

5.4.6(6) Where a determination is in effect pursuant to Article 5.4.2(b) or 5.4.2(c), detailed information concerning the Contractor's efforts to obtain Ultra Low Sulfur Diesel Fuel or diesel fuel that has a sulfur content of no more than thirty parts per million.

5.4.6(b) The Contractor shall submit the information required by Article 5.4.6(a) at the completion of work under the Public Works Contract and on a yearly basis no later than August 1 throughout the term of the Public Works Contract. The yearly report shall cover work performed the preceding fiscal year (July 1 - June 30).

5.5 Ultra Low Sulfur Diesel Fuel. In accordance with the Coordinated Construction Act for Lower Manhattan, as amended:

5.5.1 Definitions. For purposes of this Article 5.5, the following definitions apply:

5.5.1(a) "Lower Manhattan" means the area to the south of and within the following lines: a line beginning at a point where the United States pierhead line in the Hudson river as it exists now or may be extended would intersect with the southerly line of West Houston street in the borough of Manhattan extended, thence easterly along the southerly side of West Houston street to the southerly side of Houston street, thence easterly along the southerly side of Houston street to the southerly side of East Houston street, thence northeasterly along the southerly side of East Houston street to the point where it would intersect with the United States pierhead line in the East river as it exists now or may be extended, including tax lots within or immediately adjacent thereto.

5.5.1(b) "Lower Manhattan Redevelopment Project" means any project in Lower Manhattan that is funded in whole or in part with federal or State funding, or any project intended to improve transportation between Lower Manhattan and the two air terminals in the City of New York known as LaGuardia Airport and John F. Kennedy International Airport, or between Lower Manhattan and the air terminal in Newark known as Newark Liberty International Airport, and that is funded in whole or in part with federal funding.

5.5.1(c) "Nonroad Engine" means an internal combustion engine (including the fuel system) that is not used in a Motor Vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under section 7411 or section 7521 of title 42 of the United States Code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

5.5.1(d) "Nonroad Vehicle" means a vehicle that is powered by a Nonroad Engine, fifty horsepower and greater, and that is not a Motor Vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers and similar equipment, except that this terms shall not apply to horticultural maintenance vehicles used for landscaping purposes that are powered by a Nonroad Engine of sixty-five horsepower or less and that are not used in any construction program or project.

5.5.1(e) "Ultra Low Sulfur Diesel Fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million.

5.5.2 Requirements. **Contractors** and **Subcontractors** are required to use only Ultra Low Sulfur Diesel Fuel to power the diesel-powered Nonroad Vehicles with engine horsepower (HP) rating of 50 HP and above used on a Lower Manhattan Redevelopment Project and, where practicable, to reduce the emission of pollutants by retrofitting such Nonroad Vehicles with oxidation catalysts, particulate filters, or technology that achieves lowest particulate matter emissions.

5.6 Pesticides. In accordance with Section 17-1209 of the Administrative Code, to the extent that the **Contractor** or any **Subcontractor** applies pesticides to any property owned or leased by the **City**, the **Contractor** and any **Subcontractor** shall comply with chapter 12 of the Administrative Code.

## ARTICLE 6. INSPECTION

6.1 During the progress of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall at all times afford the representatives of the **City** every reasonable, safe and proper facility for inspecting all **Work** done or being done at the **Site** and also for inspecting the manufacture or preparation of materials and equipment at the place of such manufacture or preparation.

6.2 The **Contractor's** obligation hereunder shall include the uncovering or taking down of finished **Work** and its restoration thereafter; provided, however, that the order to uncover, take down and restore shall be in writing, and further provided that if **Work** thus exposed proves satisfactory, and if the **Contractor** has complied with Article 6.1, such uncovering or taking down and restoration shall be considered an item of **Extra Work** to be paid for in accordance with the provisions of Article 26. If the **Work** thus exposed proves unsatisfactory, the **City** has no obligation to compensate the **Contractor** for the uncovering, taking down or restoration.

6.3 Inspection and approval by the **Commissioner**, the **Engineer**, **Project Manager**, or **Resident Engineer**, of finished **Work** or of **Work** being performed, or of materials and equipment at the place of manufacture or preparation, shall not relieve the **Contractor** of its obligation to perform the **Work** in strict accordance with the **Contract**. Finished or unfinished **Work** not found to be in strict accordance with the **Contract** shall be replaced as directed by the **Engineer**, even though such **Work** may have been previously approved and paid for. Such corrective work is **Contract Work** and shall not be deemed **Extra Work**.

6.4 Rejected **Work** and materials shall be promptly taken down and removed from the **Site**, which must at all times be kept in a reasonably clean and neat condition.

**ARTICLE 7. PROTECTION OF WORK AND OF PERSONS  
AND PROPERTY; NOTICES AND INDEMNIFICATION**

7.1 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall be under an absolute obligation to protect the finished and unfinished **Work** against any damage, loss, injury, theft and/or vandalism and in the event of such damage, loss, injury, theft and/or vandalism, it shall promptly replace and/or repair such **Work** at the **Contractor's** sole cost and expense, as directed by the **Resident Engineer**. The obligation to deliver finished **Work** in strict accordance with the **Contract** prior to **Final Acceptance** shall be absolute and shall not be affected by the **Resident Engineer's** approval of, or failure to prohibit, the **Means and Methods of Construction** used by the **Contractor**.

7.2 During the performance of the **Work** and up to the date of **Final Acceptance**, the **Contractor** shall take all reasonable precautions to protect the persons and property of the **City** and of others from damage, loss or injury resulting from the **Contractor's**, and/or its **Subcontractors'** operations under this **Contract**. The **Contractor's** obligation to protect shall include the duty to provide, place or replace and adequately maintain at or about the **Site** suitable and sufficient protection such as lights, barricades, and enclosures.

7.3 The **Contractor** shall comply with the notification requirements set forth below in the event of any loss, damage or injury to **Work**, persons or property, or any accidents arising out of the operations of the **Contractor** and/or its **Subcontractors** under this **Contract**.

7.3.1 The **Contractor** shall make a full and complete report in writing to the **Resident Engineer** within three (3) **Days** after the occurrence.

7.3.2 The **Contractor** shall notify in writing the commercial general liability insurance carrier, and, where applicable, the worker's compensation and/or other insurance carrier, of any such loss, damage, injury, or accident, and any claim or suit arising therefrom, immediately, but not later than 20 days after such event. The **Contractor's** notice to the commercial general liability insurance carrier must expressly specify that "this notice is being given on behalf of the City of New York as Additional Insured as well as [the Contractor] as Named Insured." The **Contractor's** notice to the insurance carrier shall contain the following information: the name of the **Contractor**, the number of the **Contract**, the date of the occurrence, the location (street address and borough) of the occurrence, and the identity of the persons or things injured, damaged or lost.

7.3.2(a) At the time notice is provided to the insurance carrier(s), the **Contractor** shall provide copies of such notice to the **Comptroller** and the **Commissioner**. Notice to the **Comptroller** shall be sent to the Insurance Unit, NYC Comptroller's Office, 1 Centre Street – Room 1222, New York, New York, 10007. Notice to the **Commissioner** shall be sent to the address set forth in Schedule A of the General Conditions.

7.3.2(b) If the **Contractor** fails to provide any of the foregoing notices to any appropriate insurance carrier(s) in a timely and complete manner, the **Contractor** shall indemnify the **City** for all losses, judgments, settlements and expenses, including reasonable attorneys' fees, arising from an insurer's disclaimer of coverage citing late notice by or on behalf of the **City**.

7.4 To the fullest extent permitted by law, the **Contractor** shall indemnify, defend and hold the **City**, its employees and agents (the "Indemnitees") harmless against any and all claims (including but not limited to claims asserted by any employee of the **Contractor** and/or its **Subcontractors**) and costs and expenses of whatever kind (including but not limited to payment or reimbursement of attorneys' fees and disbursements) allegedly arising out of or in any way related to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract** or from the **Contractor's** and/or its **Subcontractors'** failure to comply with any of the provisions of this **Contract** or of the **Law**. Such costs and expenses shall include all those incurred in defending the underlying claim and those incurred in connection with the enforcement of this Article 7.4 by way of cross-claim, third-party

claim, declaratory action or otherwise. The parties expressly agree that the indemnification obligation hereunder contemplates (1) full indemnity in the event of liability imposed against the Indemnitees without negligence and solely by reason of statute, operation of law or otherwise; and (2) partial indemnity in the event of any actual negligence on the part of the Indemnitees either causing or contributing to the underlying claim (in which case, indemnification will be limited to any liability imposed over and above that percentage attributable to actual fault whether by statute, by operation of law, or otherwise). Where partial indemnity is provided hereunder, all costs and expenses shall be indemnified on a pro rata basis.

7.4.1 Indemnification under Article 7.4 or any other provision of the **Contract** shall operate whether or not **Contractor** or its **Subcontractors** have placed and maintained the insurance specified under Article 22.

7.5 The **Contractor** waives all rights against the **City** for any damages or losses for which either is covered under any insurance required under Article 22 (whether or not such insurance is actually procured) or any other insurance applicable to the operations of the **Contractor** and/or its **Subcontractors** in the performance of this **Contract**.

7.6 The provisions of this Article shall not be deemed to create any new right of action in favor of third parties against the **Contractor** or the **City**.

### CHAPTER III TIME PROVISIONS

#### ARTICLE 8. COMMENCEMENT AND PROSECUTION OF THE WORK

8.1 The **Contractor** shall commence **Work** on the date specified in a written notice signed by the **Commissioner**. The time for performance of the **Work** under the **Contract** shall be computed from the date specified in such written notice. **TIME BEING OF THE ESSENCE** to the **City**, the **Contractor** shall thereafter prosecute the **Work** diligently, using such **Means and Methods of Construction** as are in accord with Article 4 herein and as will assure its completion not later than the date specified herein, or on the date to which the time for completion may be extended.

#### ARTICLE 9. PROGRESS SCHEDULES

9.1 To enable the **Work** to be performed in an orderly and expeditious manner, the **Contractor**, within fifteen (15) **Days** after the Notice to Proceed with this **Contract**, unless otherwise directed by the **Engineer**, shall submit to the **Engineer** a proposed progress schedule in the form of a bar graph or in such other form as specified by the **Engineer**, and monthly cash flow requirements, showing:

9.1.1 The anticipated time of commencement and completion of each of the various operations to be performed under this **Contract**; and

9.1.2 The sequence and interrelation of each of these operations with the others and with those of other related **Contracts**; and

9.1.3 The estimated time required for fabrication or delivery, or both, of all materials and equipment required for the **Work**; and

9.1.4 The estimated amount in dollars the **Contractor** will claim on a monthly basis.

9.2 The proposed schedule shall be revised as directed by the **Engineer**, until finally approved by the **Engineer**, and after such approval, subject to the provisions of Article 11, shall be strictly adhered to by the **Contractor**.

9.3 If the **Contractor** shall fail to adhere to the approved progress schedule, or to the schedule as revised pursuant to Article 11, it shall promptly adopt such other or additional **Means and Methods of Construction** as will make up for the time lost and will assure completion in accordance with the approved progress schedule. The approval by the City of a progress schedule which is shorter than the time allotted under the **Contract** shall not create any liability for the **City** if the approved progress schedule is not met.

9.4 The **Contractor** will not receive any payments until the proposed progress schedule is submitted.

#### **ARTICLE 10. REQUESTS FOR INFORMATION OR APPROVAL**

10.1 From time to time as the **Work** progresses and in the sequence indicated by the approved progress schedule, the **Contractor** shall submit to the **Engineer** a specific request in writing for each item of information or approval required by the **Contractor**. These requests shall state the latest date upon which the information or approval is actually required by the **Contractor**, and shall be submitted in a reasonable time in advance thereof to enable the **Engineer** a sufficient time to act upon such submissions, or any necessary re-submissions thereof.

10.2 The **Contractor** shall not have any right to an extension of time on account of delays due to the **Contractor's** failure to submit requests for the required information or the required approval in accordance with the above requirements.

#### **ARTICLE 11. NOTICE OF CONDITIONS CAUSING DELAY AND DOCUMENTATION OF DAMAGES CAUSED BY DELAY**

11.1 After the commencement of any condition which is causing or may cause a delay in completion of the **Work**, including conditions for which the **Contractor** may be entitled to an extension of time, the following notifications and submittals are required:

11.1.1 Within seven (7) **Days** after the commencement of such condition, the **Contractor** must notify the **Engineer** in writing of the existence, nature and effect of such condition upon the approved progress schedule and the **Work**, and must state why and in what respects, if any, the condition is causing or may cause a delay.

11.1.2 If the **Contractor** shall claim to be sustaining damages for delay as provided for in this Article, within forty-five (45) **Days** from the time such damages are first incurred, and every thirty (30) **Days** thereafter for as long as such damages are being incurred, the **Contractor** shall submit to the **Commissioner** verified written statements of the details and the amounts of such damages, together with documentary evidence of such damages, ("statement of delay damages") as further detailed in Section 11.6. The **Contractor** may submit any of the above statements within such additional time as may be granted by the **Commissioner** in writing upon written request therefor. On failure of the **Contractor** to fully comply with all of the foregoing provisions, such claims shall be deemed waived and no right to recover on such claims shall exist. Damages that the **Contractor** may claim in any action arising under or by reason of this **Contract** shall not be different from or in excess of the statements made and documentation provided pursuant to this article.

11.1.3 Within 60 days of submission of the final verified statement of claims pursuant to Article 44, the **Commissioner** shall make a determination as to whether a compensable

delay has occurred and, if so, the amount of compensation due the **Contractor**. Notwithstanding the above, the **Commissioner** may make a determination as to whether a compensable delay has occurred at any time after the **Contractor's** first submission of a statement of delay damages.

11.2 Failure of the **Contractor** to strictly comply with the requirements of Article 11.1.1 may, in the discretion of the **Commissioner**, be deemed sufficient cause to deny any extension of time on account of delay arising out of such condition. Failure of the **Contractor** to strictly comply with the requirements of Articles 11.1.1 and 11.1.2 shall be deemed a conclusive waiver by the **Contractor** of any and all claims for damages for delay arising from such condition and no right to recover on such claims shall exist.

11.3 When appropriate and directed by the **Engineer**, the progress schedule shall be revised by the **Contractor** until finally approved by the **Engineer**. The revised progress schedule must be strictly adhered to by the **Contractor**.

#### 11.4 Compensable Delays

11.4.1 The **Contractor** agrees to make claim only for additional costs attributable to delay in the performance of this **Contract** necessarily extending the time for completion of the **Work** or resulting from acceleration directed by the City and required to maintain the project schedule, occasioned solely by any act or omission to act of the **City** listed below. The **Contractor** also agrees that delay from any other cause shall be compensated, if at all, solely by an extension of time to complete the performance of the **Work**.

- 11.4.1.1 The failure of the **City** to take reasonable measures to coordinate and progress the **Work**, except that the **City** shall not be responsible for the **Contractor's** obligation to coordinate and progress the **Work** of its subcontractors.
- 11.4.1.2 Extended delays attributable to the **City** in the review or issuance of change orders, in shop drawing reviews and approvals or as a result of the cumulative impact of multiple change orders, which have a verifiable impact on project costs.
- 11.4.1.3 The unavailability of the site for an extended period of time that significantly affects the scheduled completion of the **contract**.
- 11.4.1.4 The issuance by the **Engineer** of a stop work order relative to a substantial portion of work for a period exceeding thirty days, that was not brought about through any action or omission of the **Contractor**.
- 11.4.1.5 Differing site conditions that were not known or reasonably ascertainable on a pre-bid inspection of the site or review of the bid documents or other publicly available sources and that are not ordinarily encountered in the **Project's** geographical area or neighborhood or in the type of work to be performed.
- 11.4.1.6 Delays caused by the **City's** bad faith or its willful, malicious, or grossly negligent conduct;
- 11.4.1.7 Delays not contemplated by the parties;
- 11.4.1.8 Delays so unreasonable that they constitute an intentional abandonment of the **Contract** by the **City**; and
- 11.4.1.9 Delays resulting from the **City's** breach of a fundamental obligation of the **Contract**.

11.4.2 The provisions of this Article apply only to claims for additional costs attributable to delay and do not preclude determinations by the **Commissioner** allowing reimbursements for additional costs for **Extra Work** pursuant to Articles 25 and 26 of this **Contract**. To the extent that any cost attributable to delay is reimbursed as part of a change order, no additional claim for compensation under this section shall be allowed.

11.5 **Non-Compensable Delays.** The **Contractor** agrees to make no monetary request for, and has included in its bid prices for the various items of the **Contract**, the extra/additional costs attributable to any delays

caused by or attributable to the items set forth below. For such items, the **Contractor** shall be compensated, if at all, solely by an extension of time to complete the performance of the **Work**, in accordance with the provisions of Article 13. Such extensions of time will be granted, if at all, pursuant to the grounds set forth in Article 13.3.

11.5.1 The acts or omissions of any third parties, including but not limited to other contractors, public/ governmental bodies (other than **City** agencies), utilities or private enterprises, who are disclosed in the contract documents or are ordinarily encountered or generally recognized as related to the **Work**;

11.5.2 Any situation which was within the contemplation of the parties at the time of entering into the **Contract**, including any delay indicated or disclosed in the contract documents or generally recognized as related to the nature of the **Work**, and/or the existence of any facility or appurtenance owned, operated or maintained by any third party, as indicated or disclosed in the contract documents or ordinarily encountered or generally recognized as related to the nature of the **Work**;

11.5.3 Restraining orders, injunctions or judgments issued by a court which were caused by a Contractor's submission, action or inaction or by a Contractor's means and methods of construction, or by third-parties, unless such order, injunction or judgment was the result of an action or omission by the **City**;

11.5.4 Any labor boycott, strike, picketing or similar situation;

11.5.5 Any shortages of supplies of materials required by the contract work;

11.5.6 Climatic conditions, storms, floods, droughts, tidal waves, fires, hurricanes, earthquakes, landslides or other catastrophes, or acts of war or of the public enemy or terrorist acts;

11.5.7 Extra work which does not significantly affect the overall completion of the contract, reasonable delays in the review or issuance of change orders or field orders and/or in shop drawing reviews or approvals.

#### 11.6 Required Content of Submission of Statement of Delay Damages

11.6.1 In the verified written statement of delay damages required by Article 11.1.2, the following information shall be provided by the **Contractor**:

11.6.1.1 For each delay, the dates of the claimed periods of delay and, in addition, a description of the operations that were delayed, the reasons for the delay and an explanation of how they were delayed.

11.6.1.2 A detailed factual statement of the claim providing all necessary dates, locations and items of work affected by the claim.

11.6.1.3 The amount of additional compensation sought and a breakdown of that amount into categories as described in Article 26.2, subject to the limitations set forth in section 11.7.

11.6.1.4 Any additional information requested by the **Commissioner**.

#### 11.7 Recoverable Costs

11.7.1 Delay damages may be recoverable for the following costs actually and necessarily incurred in the performance of the **Work**:

11.7.1.1 Labor;

11.7.1.2 Materials;

11.7.1.3 Equipment;

- 11.7.1.4 Extended Field Office Costs;
- 11.7.1.5 Extended Contract Site Overhead;
- 11.7.1.6 Extended Home office overhead; and
- 11.7.1.7 Insurance and Bond Costs.

11.7.2 Recoverable Subcontractor Costs. When the work is performed by a **Subcontractor**, the **Contractor** may be paid the actual and necessary costs of such subcontracted work as outlined above in 11.7.1.1 through 11.7.1.6, and an additional overhead of 5% of the costs outlined in 11.7.1.1 through 11.7.1.3.

11.7.3 Non-Recoverable Costs. The parties agree that the **City** will have no liability for the following items and the **Contractor** agrees it shall make no claim for the following items:

- 11.7.3.1 Profit, or loss of anticipated or unanticipated profit;
- 11.7.3.2 Consequential damages, including but not limited to interest on monies in dispute, including interest which is paid on such monies, loss of bonding capacity, bidding opportunities, or interest in investment, or any resulting insolvency;
- 11.7.3.3 Indirect costs or expenses of any nature;
- 11.7.3.4 Direct or indirect costs attributable to performance of work where the **Contractor**, because of situations or conditions within its control, has not progressed the work in a satisfactory manner; and
- 11.7.3.5 Attorneys' fees and dispute and claims preparation expenses.

11.8 Determinations under this Article 11 are not subject to the jurisdiction of the Contract Dispute Resolution Board pursuant to the dispute resolution process set forth in Article 27.

11.9 If the parties agree that a compensable delay has occurred and agree on the amount of compensation, payment may be made pursuant to a written change order, subject to pre-audit by the **Engineering Audit Officer**, and may be post-audited by the **Comptroller** and/or the **Department**.

## **ARTICLE 12. COORDINATION WITH OTHER CONTRACTORS**

12.1 During the progress of the **Work**, **Other Contractors** may be engaged in performing other work or may be awarded other contracts for additional work on this **Project**. In that event, the **Contractor** shall coordinate the **Work** to be done hereunder with the work of such **Other Contractors** and the **Contractor** shall fully cooperate with such **Other Contractors** and carefully fit its own **Work** to that provided under other contracts as may be directed by the **Engineer**. The **Contractor** shall not commit or permit any act which will interfere with the performance of work by any **Other Contractors**.

12.2 If the **Engineer** shall determine that the **Contractor** is failing to coordinate its **Work** with the work of **Other Contractors** as the **Engineer** has directed, then the **Commissioner** shall have the right to withhold any payments otherwise due hereunder until the **Contractor** completely complies with the **Engineer's** directions.

12.3 The **Contractor** shall notify the **Engineer** in writing if any **Other Contractor** on this **Project** is failing to coordinate its work with the **Work** of this **Contract**. If the **Engineer** finds such charges to be true, the **Engineer** shall promptly issue such directions to the **Other Contractor** with respect thereto as the situation may require. The **City** shall not, however, be liable for any damages suffered by any **Other Contractor's** failure to coordinate its work with the **Work** of this **Contract** or by reason of the **Other Contractor's** failure to promptly comply with the directions so issued by the **Engineer**, or by reason of any **Other Contractor's** default in performance, it being understood that the **City** does not guarantee the responsibility or continued efficiency of any contractor. Except as provided for in Article 11.4.1.1, the **Contractor** agrees to make no claim against the **City** for

any damages relating to or arising out of any timely directions issued by the **Engineer** pursuant to this article (including but not limited to the failure of any **Other Contractor** to comply or promptly comply with such directions), or the failure of any **Other Contractor** to coordinate its work, or the default in performance of any **Other Contractor**.

12.4 The **Contractor** shall indemnify and hold the **City** harmless from any and all claims or judgments for damages and from costs and expenses to which the **City** may be subjected or which it may suffer or incur by reason of the **Contractor's** failure to comply with the **Engineer's** directions promptly; and the **Comptroller** shall have the right to exercise the powers reserved in Article 23 with respect to any claims which may be made for damages due to this **Contractor's** failure to comply with the **Engineer's** direction promptly. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.5 Should the **Contractor** sustain any damage through any act or omission of any **Other Contractor** having a contract with the **City** for the performance of work upon the **Site** or of work which may be necessary to be performed for the proper prosecution of the **Work** to be performed hereunder, or through any act or omission of a **Subcontractor** of such **Contractor**, the **Contractor** shall have no claim against the **City** for such damage, but shall have a right to recover such damage from the **Other Contractor** under the provision similar to the following provisions which apply to this **Contract** and have been or will be inserted in the contracts with such **Other Contractors**:

12.5.1 Should any **Other Contractor** having or who shall hereafter have a contract with the **City** for the performance of work upon the **Site** sustain any damage through any act or omission of the **Contractor** hereunder or through any act or omission of any **Subcontractor** of the **Contractor**, the **Contractor** agrees to reimburse such **Other Contractor** for all such damages and to defend at its own expense any suit based upon such claim and if any judgment or claims (even if the allegations of the suit are without merit) against the **City** shall be allowed the **Contractor** shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and agrees to indemnify and hold the **City** harmless from all such claims. Insofar as the facts and **Law** relating to any claim would preclude the **City** from being completely indemnified by the **Contractor**, the **City** shall be partially indemnified by the **Contractor** to the fullest extent provided by **Law**.

12.6 The **City's** right to indemnification hereunder shall in no way be diminished, waived or discharged, by its recourse to assessment of liquidated damages as provided in Article 15, or by the exercise of any other remedy provided for by **Contract** or by **Law**.

### **ARTICLE 13. EXTENSION OF TIME FOR PERFORMANCE**

13.1 If performance by the **Contractor** is delayed for a reason set forth in Article 13.3, the **Contractor** may be allowed a reasonable extension of time in conformance with this article and the **PPB** Rules.

13.2 Any extension of time may be granted only by the **Commissioner** or by the Board for the Extension of Time (hereafter "Board") (as set forth below) upon written application by the **Contractor**.

13.3 Grounds for Extension: If such application is made, the **Contractor** shall be entitled to an extension of time for delay in completion of the **Work** caused solely:

13.3.1 By the acts or omissions of the **City**, its officers, agents or employees; or

13.3.2 By the act or omissions of **Other Contractors** on this **Project**; or

13.3.3 By supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, excessive inclement weather, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes not brought about by any act or omission of the **Contractor**).

13.3.4 The **Contractor** shall, however, be entitled to an extension of time for such causes only for the number of **Days** of delay which the **Commissioner** or the Board may determine to be due solely to such causes, and then only if the **Contractor** shall have strictly complied with all of the requirements of Articles 9 and 10.

13.4 The **Contractor** shall not be entitled to receive a separate extension of time for each of several causes of delay operating concurrently, but, if at all, only for the actual period of delay in completion of the **Work** as determined by the **Commissioner** or the Board, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the **Contractor** or of its **Subcontractors** or **Materialmen**, and would of itself (irrespective of the concurrent causes) have delayed the **Work**, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.

13.5 The determination made by the **Commissioner** or the Board on an application for an extension of time shall be binding and conclusive on the **Contractor**.

13.6 The granting of an application for an extension of time for causes of delay other than those herein referred to shall be entirely within the discretion of the **Commissioner** or the Board.

13.7 Permitting the **Contractor** to continue with the **Work** after the time fixed for its completion has expired, or after the time to which such completion may have been extended has expired, or the making of any payment to the **Contractor** after such time, shall in no way operate as a waiver on the part of the **City** of any of its rights under this **Contract**.

#### 13.8 Application for Extension of Time:

13.8.1 Before the **Contractor's** time extension request will be considered, the **Contractor** shall notify the **Commissioner** of the condition which allegedly has caused or is causing the delay, and shall submit a written application to the **Commissioner** identifying:

13.8.1(a) The **Contractor**; the registration number; and **Project** description;

13.8.1(b) Liquidated damage assessment rate, as specified in the **Contract**;

13.8.1(c) Original bid amount;

13.8.1(d) The original **Contract** start date and completion date;

13.8.1(e) Any previous time extensions granted (number and duration); and

13.8.1(f) The extension of time requested.

13.8.2 In addition, the application for extension of time shall set forth in detail:

13.8.2(a) The nature of each alleged cause of delay in completing the **Work**;

13.8.2(b) The date upon which each such cause of delay began and ended and the number of **Days** attributable to each such cause;

13.8.2(c) A statement that the **Contractor** waives all claims except for those delineated in the application, and the particulars of any claims which the **Contractor** does not agree to waive. For time extensions for **Substantial Completion** and final completion payments, the application shall include a detailed statement of the dollar amounts of each element of claim item reserved; and

13.8.2(d) A statement indicating the **Contractor's** understanding that the time extension is granted only for purposes of permitting continuation of **Contract** performance and payment for **Work** performed and that the **City** retains its right to conduct an investigation and assess liquidated damages as appropriate in the future.

### 13.9 Analysis and Approval of Time Extensions:

13.9.1 For time extensions for partial payments, a written determination shall be made by the **Commissioner** who may, for good and sufficient cause, extend the time for the performance of the **Contract** as follows:

13.9.1(a) If the **Work** is to be completed within six (6) months, the time for performance may be extended for sixty (60) **Days**;

13.9.1(b) If the **Work** is to be completed within less than one (1) year but more than six (6) months, an extension of ninety (90) **Days** may be granted;

13.9.1(c) If the **Contract** period exceeds one (1) year, besides the extension granted in Article 13.9.1(b), an additional thirty (30) **Days** may be granted for each multiple of six (6) months involved beyond the one (1) year period; or

13.9.1(d) If exceptional circumstances exist, the **Commissioner** may extend the time for performance beyond the extensions in Articles 13.9.1(a), 13.9.1(b), and 13.9.1(c). In that event, the **Commissioner** shall file with the Mayor's Office of Contract Services a written explanation of the exceptional circumstances.

13.9.2 For extensions of time for **Substantial Completion** and final completion payments, the **Engineer**, in consultation with the **Commissioner**, shall prepare a written analysis of the delay (including a preliminary determination of the causes of delay, the beginning and end dates for each such cause of delay, and whether the delays are excusable under the terms of this **Contract**). The report shall be subject to review by and approval of the Board, which shall have authority to question its analysis and determinations and request additional facts or documentation. The report as reviewed and made final by the Board shall be made a part of the **Agency Contract** file. Neither the report itself nor anything contained therein shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

13.9.3 Approval Mechanism for Time Extensions for **Substantial Completion** or Final Completion Payments: An extension shall be granted only with the approval of the Board which is comprised of the **ACCO** of the **Agency**, the Corporation Counsel and the **Comptroller**, or their authorized representatives.

13.9.4 Neither the granting of any application for an extension of time to the **Contractor** or any other **Contractor** on this **Project** nor the papers, records or reports related to any application for or grant of an extension of time or determination related thereto shall be

referred to or offered in evidence by the **Contractor** or its attorneys in any action or proceeding.

13.10 **No Damage for Delay:** The **Contractor** agrees to make no claim for damages for delay in the performance of this **Contract** except as set forth in Article 11, and agrees that all it may be entitled to on account of any such delay for which compensation is not specifically provided for in Article 11 is an extension of time to complete performance of the **Work** as provided herein.

#### **ARTICLE 14. COMPLETION AND FINAL ACCEPTANCE OF THE WORK**

14.1 **Date for Substantial Completion:** The **Contractor** shall substantially complete the **Work** within the time fixed in Schedule A of the General Conditions, or within the time to which such **Substantial Completion** may be extended.

14.2 **Determining the Date of Substantial Completion:** The **Work** will be deemed to be substantially complete when the two conditions set forth in Articles 14.2.1 and 14.2.2 have been met. The **Commissioner** will then issue a Certificate of **Substantial Completion**.

14.2.1 **Inspection:** The **Engineer** has inspected the **Work** and has made a written determination that it is substantially complete.

14.2.2 **Approval of Final Punch List and Date for Final Acceptance:** Following inspection of the **Work**, the **Engineer** shall furnish the **Contractor** a final punch list, specifying all items of **Work** to be completed. The **Contractor** shall then submit to the **Engineer** dates for the completion of each specified item of **Work**. Within a reasonable time after receipt, the **Engineer**, in a written notification to the **Contractor**, shall approve the **Contractor's** completion dates or, if they are unable to agree, shall establish dates for the completion of each item of **Work**. The latest completion date specified shall be the date for **Final Acceptance** of the **Work**.

14.3 **Determining the Date of Final Acceptance:** The **Work** will be accepted as final and complete as of the date of the **Engineer's** inspection if, upon such inspection, the **Engineer** finds that all items on the **Final Approved Punch List** are complete and no further **Work** remains to be done. The **Commissioner** will then issue a written determination of **Final Acceptance**.

14.4 **Request for Inspection:** Inspection of the **Work** by the **Engineer** for the purpose of **Substantial Completion** or **Final Acceptance** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.5 **Request for Re-inspection:** If upon inspection for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer** determines that there are items of **Work** still to be performed, the **Contractor** shall promptly perform them and then request a re-inspection. If upon re-inspection, the **Engineer** determines that the **Work** is substantially complete or finally accepted, the date of such re-inspection shall be the date of **Substantial Completion** or **Final Acceptance**. Re-inspection by the **Engineer** shall be made within ten (10) **Days** after receipt of the **Contractor's** written request therefor.

14.6 **Initiation of Inspection by the Engineer:** If the **Contractor** does not request inspection or re-inspection of the **Work** for the purpose of **Substantial Completion** or **Final Acceptance**, the **Engineer** may initiate such inspection or re-inspection.

## ARTICLE 15. LIQUIDATED DAMAGES

15.1 In the event the **Contractor** fails to complete the **Work** within the time fixed for such completion in Schedule A of the General Conditions, plus authorized time extensions, or if the **Contractor**, in the sole determination of the **Commissioner**, has abandoned the **Work**, the **Contractor** shall pay to the **City** the sum fixed in Schedule A of the General Conditions, for each and every **Day** that the time consumed in completing the **Work** exceeds the time allowed therefor; which said sum, in view of the difficulty of accurately ascertaining the loss which the **City** will suffer by reason of delay in the completion of the **Work** hereunder, is hereby fixed and agreed as the liquidated damages that the **City** will suffer by reason of such delay, and not as a penalty. This article shall apply to the **Contractor** if it is defaulted pursuant to Chapter X of this **Contract**. Neither the failure to assess liquidated damages nor the granting of any time extension shall operate as a waiver or release of any claim the **City** may have against the **Contractor** for either actual or liquidated damages.

15.2 Liquidated damages received hereunder are not intended to be nor shall they be treated as either a partial or full waiver or discharge of the **City's** right to indemnification, or the **Contractor's** obligation to indemnify the **City**, or to any other remedy provided for in this **Contract** or by **Law**.

15.3 The **Commissioner** may deduct and retain out of the monies which may become due hereunder, the amount of any such liquidated damages; and in case the amount which may become due hereunder shall be less than the amount of liquidated damages suffered by the **City**, the **Contractor** shall be liable to pay the difference.

## ARTICLE 16. OCCUPATION OR USE PRIOR TO COMPLETION

16.1 Unless otherwise provided for in the specifications, the **Commissioner** may take over, use, occupy or operate any part of the **Work** at any time prior to **Final Acceptance**, upon written notification to the **Contractor**. The **Engineer** shall inspect the part of the **Work** to be taken over, used, occupied, or operated, and will furnish the **Contractor** with a written statement of the **Work**, if any, which remains to be performed on such part. The **Contractor** shall not object to, nor interfere with, the **Commissioner's** decision to exercise the rights granted by this article. In the event the **Commissioner** takes over, uses, occupies, or operates any part of the **Work**:

16.1.1 the **Commissioner** shall issue a written determination of **Substantial Completion** with respect to such part of the **Work**;

16.1.2 the **Contractor** shall be relieved of its absolute obligation to protect such part of the unfinished **Work** in accordance with Article 7;

16.1.3 the **Contractor's** guarantee on such part of the **Work** shall begin on the date of such use by the **City**; and;

16.1.4 the **Contractor** shall be entitled to a return of so much of the amount retained in accordance with Article 21 as it relates to such part of the **Work**, except so much thereof as may be retained under Articles 24 and 44.

## CHAPTER IV SUBCONTRACTS AND ASSIGNMENTS

### ARTICLE 17. SUBCONTRACTS

17.1 The **Contractor** shall not make subcontracts totaling an amount more than the percentage of the total **Contract** price fixed in Schedule A of the General Conditions, without prior written permission from the **Commissioner**. All subcontracts made by the **Contractor** shall be in writing. No work may be performed by a

**Subcontractor** prior to the **Contractor** entering into a written subcontract with the **Subcontractor** and complying with the provisions of this Article 17.

17.2 Before making any subcontracts, the **Contractor** shall submit a written statement to the **Commissioner** giving the name and address of the proposed **Subcontractor**, the portion of the **Work** and materials which it is to perform and furnish, the cost of the subcontract, the VENDEX questionnaire if required, and any other information tending to prove that the proposed **Subcontractor** has the necessary facilities, skill, integrity, past experience and financial resources to perform the **Work** in accordance with the terms and conditions of this **Contract**.

17.3 If an approved **Subcontractor** elects to subcontract any portion of its subcontract, the proposed subcontract shall be submitted in the same manner as directed above.

17.4 The **Commissioner** will notify the **Contractor** in writing whether the proposed **Subcontractor** is qualified or not qualified. If the proposed **Subcontractor** is not qualified, the **Contractor** may submit another proposed **Subcontractor** unless the **Contractor** decides to do the **Work**. No **Subcontractor** shall be permitted on the **Site** unless approved.

17.5 Before entering into any subcontract hereunder, the **Contractor** shall inform the **Subcontractor** fully and completely of all provisions and requirements of this **Contract** relating either directly or indirectly to the **Work** to be performed and the materials to be furnished under such subcontract, and every such **Subcontractor** shall expressly stipulate that all labor performed and materials furnished by the **Subcontractor** shall strictly comply with the requirements of this **Contract**.

17.6 Documents given to a **Subcontractor** for the purpose of soliciting the **Subcontractor's** bid shall include either a copy of the bid cover or a separate information sheet setting forth the **Project** name, the **Contract** number (if available), the **Agency** (as noted in Article 2.1.6), and the **Project's** location.

17.7 The **Commissioner's** approval of a **Subcontractor** shall not relieve the **Contractor** of any of its responsibilities, duties and liabilities hereunder. The **Contractor** shall be solely responsible to the **City** for the acts or defaults of its **Subcontractor** and of such **Subcontractor's** officers, agents and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the **Contractor** to the extent of its subcontract.

17.8 The **Contractor** shall be responsible for ensuring that all **Subcontractors** performing **Work** at the **Site** have either their own insurance coverage or are covered by the **Contractor's** insurance as required by Article 22.

17.9 The **Contractor** shall promptly, upon request, file with the **Engineer** a conformed copy of the subcontract and its cost. The subcontract shall provide the following:

17.9.1 **Payment to Subcontractors:** The agreement between the **Contractor** and its **Subcontractors** shall contain the same terms and conditions as to method of payment for **Work**, labor and materials, and as to retained percentages, as are contained in this **Contract**.

17.9.2 **Prevailing Rate of Wages:** The agreement between the **Contractor** and its **Subcontractors** shall include the prevailing wage rates and supplemental benefits to be paid in accordance with Labor Law Section 220.

17.9.3 **Section 6-123 of the Administrative Code:** Pursuant to the requirements of Section 6-123 of the Administrative Code, every agreement between the **Contractor** and its **Subcontractors** in excess of \$50,000 shall include a provision that the **Subcontractor** shall not engage in any unlawful discriminatory practice as defined in Title VIII of the Administrative Code (Section 8-101 et. seq.).

17.10 The **Commissioner** may deduct from the amounts certified under this **Contract** to be due to the **Contractor**, the sum or sums due and owing from the **Contractor** to the **Subcontractors** according to the terms of the said subcontracts, and in case of dispute between the **Contractor** and its **Subcontractor**, or **Subcontractors**, as to the amount due and owing, the **Commissioner** may deduct and withhold from the amounts certified under this **Contract** to be due to the **Contractor** such sum or sums as may be claimed by such **Subcontractor**, or **Subcontractors**, in a sworn affidavit, to be due and owing until such time as such claim or claims shall have been finally adjusted.

17.11 On **Contracts** where 100% performance bonds and payment bonds are executed, the **Contractor** shall include on each requisition for payment the following data: **Subcontractor's** name, value of the subcontract, total amount previously paid to **Subcontractor** for **Work** previously requisitioned, and the amount, including retainage, to be paid to the **Subcontractor** for **Work** included in the requisition.

17.12 On **Contracts** where performance bonds and payment bonds are not executed, the **Contractor** shall include with each requisition for payment submitted hereunder, a signed statement from each and every **Subcontractor** and/or **Materialman** for whom payment is requested in such requisition. Such signed statement shall be on the letterhead of the **Subcontractor** and/or **Materialman** for whom payment is requested and shall (i) verify that such **Subcontractor** and/or **Materialman** has been paid in full for all work performed and/or material supplied to date, exclusive of any amount retained and any amount included on the current requisition, and (ii) state the total amount of retainage to date, exclusive of any amount retained on the current requisition.

#### ARTICLE 18. ASSIGNMENTS

18.1 The **Contractor** shall not assign, transfer, convey or otherwise dispose of this **Contract**, or the right to execute it, or the right, title or interest in or to it or any part thereof, or assign, by power of attorney or otherwise any of the monies due or to become due under this **Contract**, unless the previous written consent of the **Commissioner** shall first be obtained thereto, and the giving of any such consent to a particular assignment shall not dispense with the necessity of such consent to any further or other assignments.

18.2 Such assignment, transfer, or conveyance shall not be valid until filed in the office of the **Commissioner** and the **Treasurer**, with the written consent of the **Commissioner** endorsed thereon or attached thereto.

18.3 Failure to obtain the previous written consent of the **Commissioner** to such an assignment, transfer or conveyance, may result in the revocation and annulment of this **Contract**. The **City** shall thereupon be relieved and discharged from any further liability to the **Contractor**, its assignees, transferees or sublessees, who shall forfeit and lose all monies therefor earned under the **Contract**, except so much as may be required to pay the **Contractor's** employees.

18.4 The provisions of this clause shall not hinder, prevent, or affect an assignment by the **Contractor** for the benefit of its creditors made pursuant to the **Laws** of the State of New York.

18.5 This **Contract** may be assigned by the **City** to any corporation, agency or instrumentality having authority to accept such assignment.

**CHAPTER V  
CONTRACTOR'S SECURITY AND GUARANTY**

**ARTICLE 19. SECURITY DEPOSIT**

19.1 The bid deposit, if required, shall be retained by the **Comptroller** as security for the **Contractor's** faithful performance of the **Contract** and will be returned to the **Contractor** only after the sum retained under Article 21 equals the amount of the bid deposit, subject to the other provisions of this **Contract**. If performance and payment bonds are required, any bid security posted shall be returned within a reasonable time after posting of such bonds and execution of this **Contract** by the **City**. When no partial payments are provided, the bid deposit will be released when final payment is certified to the **Comptroller** for payment.

19.2 If the **Contractor** is declared in default under Article 48 prior to the return of the deposit, or if any claim is made such as referred to in Article 23, the amount of such deposit, or so much thereof as the **Comptroller** may deem necessary, may be retained and then applied by the **Comptroller**:

19.2.1 To compensate the **City** for any expense, loss or damage suffered or incurred by reason of or resulting from such default, including the cost of re-letting and liquidated damages; or

19.2.2 To indemnify the **City** against any and all claims.

**ARTICLE 20. PAYMENT GUARANTEE**

20.1 On **Contracts** where 100% performance bonds and payment bonds are executed, this article does not apply.

20.2 In the event the terms of this **Contract** do not require the **Contractor** to provide a payment bond, the **City** shall, in accordance with the terms of this article, guarantee payment of all lawful demands for:

20.2.1 Wages and compensation for labor performed and/or services rendered; and

20.2.2 Materials, equipment, and supplies provided, whether incorporated into the **Work** or not, when demands have been filed with the **City** as provided hereinafter by any person, firm, or corporation which furnished labor, material, equipment, supplies, or any combination thereof, in connection with the **Work** performed hereunder (hereinafter referred to as the "beneficiary") at the direction of the **City** or the **Contractor**.

20.3 The provisions of Article 20.2 are subject to the following limitations and conditions:

20.3.1 The guarantee is made for the benefit of all beneficiaries as defined in Article 20.2 provided that those beneficiaries strictly adhere to the terms and conditions of this Article 20.3.

20.3.2 Nothing in this article shall prevent a beneficiary providing labor, services or material for the **Work** from suing the **Contractor** for any amounts due and owing the beneficiary by the **Contractor**.

20.3.3 All demands made against the **City** pursuant to this article shall be made within four (4) months from the date payment is due on the invoice or invoices submitted by the beneficiary to the **Contractor** for labor or **Work** done or for materials or supplies delivered, or, if the demand is for wages, four (4) months from the date the wages were due to be paid to the beneficiary.

20.3.4 All demands made against the City by such beneficiary shall be presented to the **Engineer** along with all written documentation concerning the demand which the **Engineer** deems appropriate or necessary, which may include, but shall not be limited to: the subcontract; any invoices presented to the **Contractor** for payment; the notarized statement of the beneficiary that the demand is due and payable, that a request for payment has been made of the **Contractor** and that the demand has not been paid by the **Contractor** within the time allowed for such payment by the subcontract; and copies of any correspondence between the beneficiary and the **Contractor** concerning such demand. The City shall notify the **Contractor** that a demand has been made. The **Contractor** shall inform the City of any defenses to the demand, and shall forward to the City any documents the City requests concerning the demand.

20.3.5 The City shall make payment only if, after considering all defenses presented by the **Contractor**, it determines that the payment is due and owing to the beneficiary making the demand.

20.3.6 The City will not initiate the payment process of this article or make payment on a demand where the beneficiary making the demand has filed a lien against the **Work** or otherwise sues the City prior to receiving a written notice from the City that it will not pay the demand.

20.3.7 No beneficiary shall be entitled to interest from the City, or to any other costs, including, but not limited to, attorney's fees.

20.4 Upon the receipt by the City of a demand pursuant to this article, the City may withhold from any payment otherwise due and owing to the **Contractor** under this **Contract** an amount sufficient to satisfy the demand.

20.4.1 In the event the City determines that the demand is valid, the City shall notify the **Contractor** of such determination and the amount thereof, and direct the **Contractor** to immediately pay such amount to the beneficiary. In the event the **Contractor**, within seven (7) days of receipt of such notification from the City, fails to pay the beneficiary, such failure shall constitute an automatic and irrevocable assignment of payment by the **Contractor** to the beneficiary for the amount of the demand determined by the City to be valid. The **Contractor**, without further notification or other process, hereby gives its unconditional consent to such assignment of payment to the beneficiary and authorizes the City, on its behalf, to take all necessary actions to implement such assignment of payment, including without limitation the execution of any instrument or documentation necessary to effectuate such assignment.

In the event that the amount otherwise due and owing to the **Contractor** by the City is insufficient to satisfy such demand, the City may, at its option, require payment from the **Contractor** of an amount sufficient to cover such demand and exercise any other right to require or recover payment which the City may have under **Law** or **Contract**.

20.4.2 In the event the City determines that the demand is invalid, any amount withheld pending the City's review of such demand shall be paid to the **Contractor**; provided, however, no lien has been filed. In the event a lien has been filed, the terms and conditions set forth in Article 23 shall apply.

20.5 The provisions of this article shall not prevent the City and the **Contractor** from resolving disputes in accordance with the **PPB** Rules, where applicable.

20.6 In the event the City determines that the beneficiary is entitled to payment pursuant to this article, such determination and any defenses and counterclaims raised by the **Contractor** shall be taken into account in evaluating the **Contractor's** performance.

20.7 Nothing in this article shall relieve the **Contractor** of the obligation to pay the claims of all persons with valid and lawful claims against the **Contractor** relating to the **Work**.

20.8 The **Contractor** shall not require any performance, payment or other bonds of any **Subcontractor** if this **Contract** does not require such bonds of the **Contractor**.

20.9 The payment guarantee made pursuant to this article shall be construed in a manner consistent with Section 137 of the State Finance Law and shall afford to persons furnishing labor or materials to the **Contractor** or his **Subcontractors** in the prosecution of the **Work** under this **Contract** all of the rights and remedies afforded to such persons by such section, including but not limited to, the right to commence an action against the **City** on the payment guarantee provided by this article within the one year limitations period set forth in Section 137(4)(b).

## ARTICLE 21. RETAINED PERCENTAGE

21.1 If this **Contract** requires 100% performance and payment security, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, five (5%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.2 If this **Contract** does not require 100% performance and payment security and if the price for which this **Contract** was awarded does not exceed \$500,000, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher.

21.3 If this **Contract** does not require 100% performance and payment security and if the price for which this **Contract** was awarded exceeds \$500,000, then as further security for the faithful performance of this **Contract**, the **Commissioner** shall deduct, and retain until the substantial completion of the **Work**, up to ten (10%) percent of the value of **Work** certified for payment in each partial payment voucher. The percentage to be retained is set forth in Schedule A of the General Conditions.

## ARTICLE 22. INSURANCE

22.1 Types of Insurance: From the date the **Contractor** is required to provide Proof of Insurance pursuant to Article 22.3.1 through the date of completion of all required **Work** (including punch list work as certified in writing by the **Resident Engineer**), the **Contractor** shall effect and maintain the following types of insurance if and as indicated in Schedule A of the General Conditions (with the minimum limits and special conditions specified in Schedule A). Such insurance shall be issued by companies that meet the standards of Article 22.2.1 and shall be primary (and non-contributing) to any insurance or self-insurance maintained by the **City**.

22.1.1 Commercial General Liability Insurance: The **Contractor** shall provide a Commercial General Liability Insurance policy covering the **Contractor** as Named Insured and the **City** as an Additional Insured. This policy shall protect the **City** and the **Contractor** from claims for property damage and/or bodily injury, including death, which may arise from any of the operations under this **Contract**. Coverage under this policy shall be at least as broad as that provided by ISO Form CG 0001 (10/01 ed.), must be "occurrence" based rather than "claims-made", and shall include, without limitation, the following types of coverage: Premises Operations, Products and Completed Operations, Contractual Liability (including the tort liability of another assumed in a contract), Broad Form Property Damage, Medical Payments, Independent Contractors, Personal Injury (Contractual Exclusion deleted), Explosion, Collapse and Underground Property, and Incidental Malpractice. If such insurance contains an aggregate limit, it shall apply separately to this **Project**.

22.1.1(a) Such Commercial General Liability Insurance shall name the City, together with its officials and employees, as an Additional Insured under this policy. Coverage for the City as Additional Insured shall specifically include the City's officials and employees, and shall be at least as broad as either Insurance Services Office ("ISO") Form CG 20 10 (07/04 ed.) or Form CG 20 33 (07/04 ed.) and shall provide completed operations coverage at least as broad as CG 20 37 (07/04 ed.).

22.1.1(b) If this **Contract** is equal to or greater than Ten Million Dollars (\$10,000,000.00), each Commercial General Liability Insurance policy provided shall contain each of the following endorsements:

22.1.1(b)(i) The Duties in the Event of Occurrence, Claim or Suit condition of the policy is amended per the following: If and insofar as knowledge of an "occurrence", "claim", or "suit" is relevant to the City of New York as Additional Insured under this policy, such knowledge by an agent, servant, official, or employee of the City of New York will not be considered knowledge on the part of the City of New York of the "occurrence", "claim", or "suit" unless the following position shall have received notice thereof from such agent, servant, official, or employee: Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department; and

22.1.1(b)(ii) Any notice, demand or other writing by or on behalf of the Named Insured to the Insurance Company shall also be deemed to be a notice, demand, or other writing on behalf of the City as Additional Insured. Any response by the Insurance Company to such notice, demand or other writing shall be addressed to Named Insured and to the City at the following addresses: Insurance Unit, NYC Comptroller's Office, 1 Centre Street – Room 1222, New York, N.Y. 10007; and Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, NY 10007.

22.1.2 Workers' Compensation Insurance and Disability Benefits Insurance: The **Contractor** shall provide, and ensure that each **Subcontractor** provides, Workers Compensation Insurance and Disability Benefits Insurance in accordance with the **Laws** of the State of New York on behalf of all employees providing services under this **Contract** (except for those qualifying for insurance pursuant to Article 22.1.4).

22.1.3 Employers' Liability Insurance: The **Contractor** shall provide, and ensure that each **Subcontractor** provides, Employers Liability Insurance affording compensation due to bodily injury by accident or disease sustained by any employee arising out of and in the course of his/her employment under this **Contract** (except for those qualifying for insurance pursuant to Article 22.1.4).

22.1.4 United States Longshoremen's and Harbor Workers Act and/or Jones Act Insurance: The **Contractor** shall provide, and ensure that each **Subcontractor** provides, insurance in accordance with the United States Longshoremen's and Harbor Workers Act and/or the Jones Act, on behalf of all qualifying employees providing services under this **Contract**.

22.1.5 Builders' Risk Insurance: The **Contractor** shall provide a Builders' Risk Insurance policy covering all risks in completed value form. Such policy shall cover the total value of the **Work** performed in accordance with Schedule A, as well as the value of any equipment, supplies and/or material for the **Project** that may be in storage (on or off the **Site**) or in transit. The policy shall cover the cost of removing debris, including demolition as may be legally necessary by the operation of any law, ordinance or regulation, and for loss or damage to any owned, borrowed, leased or rented capital equipment, tools, including tools of their agents and employees, staging towers and forms,

and property of the **City** held in their care, custody and/or control. Such policy shall name as insureds the **City**, the **Contractor**, and its **Subcontractors**. The Builders' Risk policy shall contain the following endorsements:

22.1.5(a) The **City** and the **Contractor** shall be named as loss payee for the **Work** in order of precedence, as their interest may appear; and

22.1.5(b) In the event the loss occurs at an occupied facility, the policy shall permit occupancy without the consent of the Insurance Company; and

22.1.5(c) In the event that the insurance policy has been issued by a mutual insurance company, the following language shall be included: "The City of New York is not liable for any premium or assessment under this policy of insurance. The First Named Insured is solely liable therefor."

22.1.6 Comprehensive Business Automobile Liability Insurance: The **Contractor** shall provide a Comprehensive Business Automobile Liability policy for liability arising out of any owned, non-owned, leased and hired vehicles to be used in connection with this **Contract**. Coverage should be at least as broad as ISO Form CA0001, ed. 10/01.

22.1.6(a) If autos are used for transporting hazardous materials, the Automobile Liability Insurance shall be endorsed to provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90.

22.1.7 Pollution/Environmental Liability Insurance: The **Contractor** shall provide Pollution/Environmental Liability Insurance covering bodily injury and property damage, including loss of use of damaged property or of property that has not been physically injured. Such insurance shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants (including asbestos), including any loss, cost or expense incurred as a result of any cleanup of pollutants (including asbestos) or in the investigation, settlement or defense of any claim, suit, or proceedings against the **City** arising from the operations under this **Contract**. Such insurance shall be in the **Contractor's** name and list the **City** as an Additional Insured. Coverage for the **City** as Additional Insured shall specifically include the **City's** officials and employees, and shall be at least as broad as provided to the **Contractor** for this **Project**.

22.1.7(a) If such coverage is written on a claims-made policy, such policy shall have a retroactive date on or before the effective date of this **Contract**, and continuous coverage shall be maintained, or an extended discovery period exercised, for a period of not less than three years from the time the **Work** under this **Contract** is completed.

22.1.8 Marine Insurance:

22.1.8(a) Marine Protection and Indemnity Insurance: The **Contractor** shall provide a Marine Protection and Indemnity policy with coverage at least as broad as policy form SP-23. The policy shall provide coverage for the **Contractor** and for the **City** (together with its officials and employees) as Additional Insured for bodily injury and property damage arising from marine operations under this **Contract** including injury or death of crew members (if not fully provided through other insurance), damage to piers, wharves and other fixed or movable structures and loss of or damage to any other vessel or craft, or to property on such other vessel or craft, not caused by collision.

22.1.8(b) Ship Repairers Legal Liability Insurance: The **Contractor** shall provide a Ship Repairers Legal Liability Insurance policy covering all repair operations under this **Contract** at

or in the vicinity of a designated approved port or yard under this **Contract**. The policy shall provide coverage from the point of acceptance of care custody and control of any **City** vessel. The policy shall provide Bailee Coverage for any **City** vessel in the **Contractor's** care, custody and control and coverage for damage to property of others caused by any **City** vessel in the **Contractor's** care custody and control.

22.1.8(c) Collision Liability/Towers Liability Insurance: The **Contractor** shall provide a Collision Liability/Towers Liability Insurance policy with coverage for the **Contractor** and for the **City** (together with its officials and employees) as Additional Insured at least as broad as the American Institute Tug Form (08/01/76) for all tugs used under this **Contract** and Collision Liability per American Institute Hull Clauses (6/2/77).

22.1.8(d) Marine Pollution Liability Insurance: The **Contractor** shall provide a Marine Pollution Liability Insurance policy covering itself as Named Insured and the **City** (together with its officials and employees) as Additional Insured for liability arising from the discharge or substantial threat of a discharge of oil, or from the release or threatened release of a hazardous substance including injury to, or economic losses resulting from, the destruction of or damage to real property, personal property or natural resources. Coverage under this policy shall be at least as broad as that provided by Water Quality Insurance Syndicate Form (09/98 ed.).

22.1.9 The **Contractor** shall provide such other types of insurance, at such minimum limits, as are specified in Schedule A of the General Conditions.

## 22.2 General Requirements for Insurance Policies:

22.2.1 All required insurance policies shall be maintained with companies that may lawfully issue the required policy and have an A.M. Best rating of at least A- VII or a Standard and Poor's rating of at least AA, unless prior written approval is obtained from the Mayor's Office of Operations.

22.2.2 The **Contractor** shall be solely responsible for the payment of all premiums for all required policies and all deductibles and self-insured retentions to which such policies are subject, whether or not the **City** is an insured under the policy.

22.2.3 In his/her sole discretion, the **Commissioner** may, subject to the approval of the **Comptroller** and the Corporation Counsel, accept Letters of Credit and/or custodial accounts in lieu of required insurance.

22.2.4 The **City's** limits of coverage for all types of insurance required pursuant to Schedule A of the General Conditions shall be the greater of (i) the minimum limits set forth in Schedule A or (ii) the limits provided to the **Contractor** as Named Insured under all primary, excess and umbrella policies of that type of coverage.

22.2.5 All required insurance policies, except for insurance required pursuant to Sections 22.1.2, 22.1.3, and 22.1.4, shall contain the following endorsement: "This policy may not be cancelled, terminated, modified or changed unless thirty (30) days prior written notice is sent by the Insurance Company to the Named Insured (or First Named Insured, as appropriate), the **Commissioner**, and to the **Comptroller**, attn: Office of Contract Administration, Municipal Building, Room 1005, New York, New York 10007."

### 22.3 Proof of Insurance:

22.3.1 Within ten (10) Days of award, the **Contractor** shall, for each policy required under this **Contract**, except for Workers Compensation Insurance and Disability Benefits Insurance and builders' risk insurance, file a Certificate of Insurance with the **Commissioner** pursuant to Article 22.6. For Workers' Compensation Insurance and Disability Benefits Insurance, the **Contractor** shall file proof of insurance in a form acceptable to the **Commissioner** within ten (10) Days of award. Accord forms are not acceptable proof of workers' compensation coverage. The **Contractor** must submit one of the following forms to the Department, or another form acceptable to the Department: C-105.2 -- Certificate of Workers' Compensation Insurance, or U-26.3 -- State Insurance Fund Certificate of Workers' Compensation Insurance. For builders' risk insurance, the **Contractor** shall file a Certificate of Insurance with the **Commissioner** at the direction of the **Commissioner** but in any event no later than ten (10) Days prior to commencement of the **Work**.

22.3.1(a) All Certificates of Insurance shall be in a form acceptable to the **City** and shall certify the issuance and effectiveness of the types of insurance specified in Schedule A, each with the specified minimum limits and evidence of the compliance with the Additional Insured or Named Insured provisions of Articles 22.1.1(a), 22.1.5, 22.1.7, and 22.1.8, as applicable. All Certificate(s) of Insurance shall be accompanied by either a duly executed "Certification by Broker" in the form contained in Part II of Schedule A or completed copies of all policies referenced in the Certificate of Insurance. In the absence of completed policies, binders are acceptable.

22.3.2 Certificates of Insurance confirming renewals of insurance shall be submitted to the **Commissioner** prior to the expiration date of coverage of policies required under this **Contract**. Such Certificates of Insurance shall comply with the requirements of Article 22.3.1(a) and, if applicable, Article 22.3.1(b).

22.3.3 The **Contractor** shall be obligated to provide the **City** with a copy of any policy required by this Article 22 upon the demand for such policy by the **Commissioner** or the New York City Law Department.

### 22.4 Operations of the Contractor:

22.4.1 The **Contractor** shall not commence the **Work** unless and until all required certificates have been submitted to and accepted by the **Commissioner**. Acceptance by the **Commissioner** of a certificate hereunder does not excuse the **Contractor** from securing a policy consistent with all provisions of this Article or of any liability arising from its failure to do so.

22.4.2 The **Contractor** shall be responsible for providing continuous insurance coverage in the manner, form, and limits required by this **Contract** and shall be authorized to perform **Work** only during the effective period of all required coverage.

22.4.3 In the event that any of the required insurance policies lapse, are revoked, suspended or otherwise terminated, for whatever cause, the **Contractor** shall immediately stop all **Work**, and shall not recommence **Work** until authorized in writing to do so by the **Commissioner**. Upon quitting the **Site**, except as otherwise directed by the **Commissioner**, the **Contractor** shall leave all plant, materials, equipment, tools and supplies on the **Site**. **Contract** time shall continue to run during such periods and no extensions of time will be granted. The **Commissioner** may also declare the **Contractor** in default for failure to maintain required insurance.

22.5 The **City** as Additional Insured or Loss Payee under **Subcontractors'** Insurance. The **Contractor** shall ensure that each **Subcontractor** name the **City** as Additional Insured or loss payee, as appropriate, under all

policies covering **Work** performed by such **Subcontractor** under this **Contract**. The **City's** coverage as Additional Insured shall include the **City's** officials and employees and be at least as broad as that provided to the **Contractor**. The foregoing requirements shall not apply to insurance provided pursuant to Articles 22.1.2, 22.1.3, and 22.1.4.

22.6 Wherever reference is made in Article 7 or this Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth in Schedule A of the General Conditions. In the event no address is set forth in Schedule A, such documents are to be sent to the **Commissioner's** address as provided elsewhere in this **Contract**.

22.7 If the **Contract** involves disposal of hazardous materials, the **Contractor** shall dispose such materials only at sites where the disposal site operator maintains Pollution Legal Liability Insurance in the amount of at least \$2,000,000 for losses arising from such disposal site.

22.8 Materiality/Non-Waiver: The **Contractor's** failure to secure policy(ies) in complete conformity with this Article, or to give the Insurance Company timely notice of any sort required in this **Contract** on behalf of the **City**, or to do anything else required by this Article shall constitute a material breach of this **Contract**. Such breach shall not be waived or otherwise excused by any action or inaction by the **City** at any time.

22.9 Other Remedies: Insurance coverage in the minimum amounts provided for herein shall not relieve the **Contractor** or **Subcontractors** of any liability under this **Contract**, nor shall it preclude the **City** from exercising any rights or taking such other actions as are available to it under any other provisions of this **Contract** or **Law**.

#### **ARTICLE 23. MONEY RETAINED AGAINST CLAIMS**

23.1 If any claim shall be made by any person or entity (including **Other Contractors** with the **City** on this **Project**) against the **City** or against the **Contractor** and the **City** for any of the following:

(a) An alleged loss, damage, injury, theft or vandalism of any of the kinds referred to in Articles 7 and 12, plus the reasonable costs of defending the **City**, which in the opinion of the **Comptroller** may not be paid by an insurance company (for any reason whatsoever); or

(b) An infringement of copyrights, patents or use of patented articles, tools, etc., as referred to in Article 57; or

(c) Damage claimed to have been caused directly or indirectly by the failure of the **Contractor** to perform the **Work** in strict accordance with this **Contract**,

the amount of such claim, or so much thereof as the **Comptroller** may deem necessary, may be withheld by the **Comptroller**, as security against such claim, from any money due hereunder. The **Comptroller**, in his/her discretion, may permit the **Contractor** to substitute other satisfactory security in lieu of the monies so withheld.

23.2 If an action on such claim is timely commenced and the liability of the **City**, or the **Contractor**, or both, shall have been established therein by a final judgment of a Court of competent jurisdiction, or if such claim shall have been admitted by the **Contractor** to be valid, the **Comptroller** shall pay such judgment or admitted claim out of the monies retained by the **Comptroller** under the provisions of this article, and return the balance, if any, without interest, to the **Contractor**.

23.3 Liens: If at any time before or within thirty (30) **Days** after the **Work** is completed and accepted by the **City**, any persons claiming to have performed any labor or furnished any material toward the performance or completion of this **Contract**, shall file with the **Agency** and with the **Treasurer** any notice as is described in the

New York State Lien Law, or any act of the Legislature of the State of New York, the City shall retain, from the monies due or to become due under this Contract, so much of such monies as shall be sufficient to pay the amount claimed in said notice, together with the reasonable costs of any action or actions brought or that may be brought to enforce such lien. The monies so retained shall be held by the City until the lien thereon created by the said act and the filing of the said notice shall be discharged pursuant to Law.

#### ARTICLE 24. MAINTENANCE AND GUARANTY

24.1 The Contractor shall promptly repair, replace, restore or rebuild, as the Commissioner may determine, any finished Work in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of Substantial Completion (or use and occupancy in accordance with Article 16), except where other periods of maintenance and guarantee are provided for.

24.2 As security for the faithful performance of its obligations hereunder, the Contractor, upon filing its requisition for payment on Substantial Completion, shall deposit with the Commissioner a sum equal to one (1%) percent of the price (or the amount fixed in Schedule A of the General Conditions) in cash or certified check upon a state or national bank and trust company or a check of such bank and trust company signed by a duly authorized officer thereof and drawn to the order of the Comptroller, or obligations of the City, which the Comptroller may approve as of equal value with the sum so required.

24.3 In lieu of the above, the Contractor may make such security payment to the City by authorizing the Commissioner in writing to deduct the amount from the Substantial Completion payment which shall be deemed the deposit required above.

24.4 If the Contractor has faithfully performed all of its obligations hereunder the Commissioner shall so certify to the Comptroller within five (5) Days after the expiration of one (1) year from the date of Substantial Completion and acceptance of the Work or within thirty (30) Days after the expiration of the guarantee period fixed in the Specifications. The security payment shall be repaid to the Contractor without interest within thirty (30) Days after certification by the Commissioner to the Comptroller that the Contractor has faithfully performed all of its obligations hereunder.

24.5 Notice by the Commissioner to the Contractor to repair, replace, rebuild or restore such defective or damaged Work shall be timely, pursuant to this article, if given not later than ten (10) Days subsequent to the expiration of the one (1) year period or other periods provided for herein.

24.6 If the Contractor shall fail to repair, replace, rebuild or restore such defective or damaged Work promptly after receiving such notice, the Commissioner shall have the right to have the Work done by others in the same manner as provided for in the completion of a defaulted Contract, under Article 51.

24.7 If the security payment so deposited is insufficient to cover the cost of such Work, the Contractor shall be liable to pay such deficiency on demand by the Commissioner.

24.8 The Engineer's certificate setting forth the fair and reasonable cost of repairing, replacing, rebuilding or restoring any damaged or defective Work when performed by one other than the Contractor, shall be binding and conclusive upon the Contractor as to the amount thereof.

24.9 The Contractor shall obtain all manufacturers' warranties and guaranties of all equipment and materials required by this Contract in the name of the City and shall deliver same to the Commissioner. All of the City's rights and title and interest in and to said manufacturers' warranties and guaranties may be assigned by the City to any subsequent purchasers or lessees of the premises.

**CHAPTER VI  
CHANGES, EXTRA WORK AND DOCUMENTATION OF CLAIM**

**ARTICLE 25. CHANGES**

25.1 Changes may be made to this **Contract** only as duly authorized in writing by the **Commissioner** in accordance with the **Laws** and this **Contract**. All such changes, modifications and amendments will become a part of the **Contract**. **Work** so ordered shall be performed by the **Contractor**.

25.2 **Contract** changes will be made only for **Work** necessary to complete the **Work** included in the original scope of the **Contract** and/or for non-material changes to the scope of the **Contract**. Changes are not permitted for any material alteration in the scope of **Work** in the **Contract**.

25.3 The **Contractor** shall be entitled to a price adjustment for **Extra Work** performed pursuant to a written change order. Adjustments to price shall be computed in one or more of the following ways:

25.3.1 By applicable unit prices specified in the **Contract**; and/or

25.3.2 By agreement of a fixed price; and/or

25.3.3 By time and material records; and/or

25.3.4 In any other manner approved by the **CCPO**.

25.4 All payments for change orders are subject to pre-audit by the **Engineering Audit Officer** and may be post-audited by the **Comptroller** and/or the **Department**.

**ARTICLE 26. METHODS OF PAYMENT FOR OVERRUNS AND EXTRA WORK**

26.1 **Overrun of Unit Price Item**: An overrun is any quantity of a unit price item which the **Contractor** is directed to provide which is in excess of one hundred twenty-five (125%) percent of the estimated quantity for that item set forth in the bid schedule.

26.1.1 For any unit price item, the **Contractor** will be paid at the unit price bid for any quantity up to one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule. If during the progress of the **Work**, the actual quantity of any unit price item required to complete the **Work** approaches the estimated quantity for that item, and for any reason it appears that the actual quantity of any unit price item necessary to complete the **Work** will exceed the estimated quantity for that item by twenty-five (25%) percent, the **Contractor** shall immediately notify the **Engineer** of such anticipated overrun. The **Contractor** shall not be compensated for any quantity of a unit price item provided which is in excess of one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule without written authorization from the **Engineer**.

26.1.2 If the actual quantity of any unit price item necessary to complete the **Work** will exceed one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid schedule, the **City** reserves the right and the **Contractor** agrees to negotiate a new unit price for such item. In no event shall such negotiated new unit price exceed the unit bid price. If the **City** and **Contractor** cannot agree on a new unit price, then the **City** shall order the **Contractor** and the **Contractor** agrees to provide additional quantities of the item on a time and material basis for the actual and reasonable cost as determined under Article 26.2, but in no event at a unit price exceeding the unit price bid.

26.2 **Extra Work:** For **Extra Work** where payment is by agreement on a fixed price in accordance with Article 25.3.2, the price to be paid for such **Extra Work** shall be based on the fair and reasonable estimated cost of the items set forth below. For **Extra Work** where payment is on a time and material basis in accordance with Article 25.3.3, the price to be paid for such **Extra Work** shall be the actual and reasonable cost of the items set forth below.

26.2.1 Necessary materials (including transportation to the **Site**); plus

26.2.2 Necessary direct labor, including payroll taxes and supplemental benefits; plus

26.2.3 Sales and personal property taxes, if any, required to be paid on materials not incorporated into such **Extra Work**; plus

26.2.4 Reasonable rental value of **Contractor**-owned, necessary plant and equipment other than small tools, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per operating hour:  $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$ . Reasonable rental value is defined as the lower of either seventy-five percent of the monthly prorated rental rates established in "The AED Green Book, Rental Rates and Specifications for Construction Equipment" published by PRIMEDIA (the "Green Book"), or seventy-five percent of the monthly prorated rental rates established in the "Rental Rate Blue Book for Construction Equipment" published by PRIMEDIA (the "Blue Book"). The reasonable rental value is inclusive of all operating costs except for fuel/energy consumption and equipment operator's wages/costs. For multiple shift utilization, reimbursement shall be calculated as follows: first shift shall be seventy-five percent of such rental rates; second shift shall be sixty percent of the first shift rate; and third shift shall be forty percent of the first shift rate. Equipment on standby shall be reimbursed at one-third the prorated monthly rental rate. **Contractor**-owned equipment includes equipment from rental companies affiliated with or controlled by the **Contractor**, as determined by the **Commissioner**. In establishing cost reimbursement for non-operating contractor-owned equipment (scaffolding, sheeting systems, road plates, etc.), the City may restrict reimbursement to a purchase-salvage/life cycle basis if less than the computed rental costs; plus

26.2.5 Necessary installation and dismantling of such plant and equipment, including transportation to and from the **Site**, if any, provided that, in the case of non-**Contractor**-owned equipment rented from a third party, the cost of installation and dismantling are not allowable if such costs are included in the rental rate; plus

26.2.6 Reasonable rental costs of non-**Contractor**-owned necessary plant and equipment other than small tools, plus fuel/energy costs. Except for fuel costs for pick-up trucks which shall be reimbursed based on a consumption of five (5) gallons per shift, fuel costs shall be reimbursed based on actual costs or, in the absence of auditable documentation, the following fuel consumption formula per hour of operation:  $(.035) \times (\text{HP rating}) \times (\text{Fuel cost/gallon})$ . In lieu of renting, the City reserves the right to direct the purchase of non-operating equipment (scaffolding, sheeting systems, road plates, etc.), with payment on a purchase-salvage/life cycle basis, if less than the projected rental costs; plus

26.2.7 Workers' compensation insurance, and any insurance coverage expressly required by the **City** for the performance of the **Extra Work** which is different than the types of insurance required by Article 22 and Schedule A of the General Conditions. The cost of workers' compensation insurance shall be based upon the Manual Rate for such insurance for the applicable work classifications/codes, in accordance with the most recent schedule promulgated by the New York Compensation Insurance Rating Board; plus

26.2.8 Additional costs incurred as a result of the **Extra Work** for performance and payment bonds; plus

26.2.9 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5 as compensation for overhead, except that no percentage for overhead will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes. Overhead shall include without limitation, all costs and expenses in connection with administration, management superintendence, small tools, and insurance required by Schedule A of the General Conditions other than workers' compensation insurance; plus

26.2.10 Ten (10%) percent of the total of items in Articles 26.2.1 through 26.2.5, plus item 26.2.9, as compensation for profit, except that no percentage for profit will be allowed on **Payroll Taxes** or on the premium portion of overtime pay or on sales and personal property taxes; plus

26.2.11 Five (5%) percent of the total of items in Article 26.2.6, 26.2.7, and 26.2.8 as compensation for overhead and profit.

26.3 Where the **Extra Work** is performed in whole or in part by other than the **Contractor's** own forces pursuant to Article 26.2, the **Contractor** shall be paid, subject to pre-audit by the **Engineering Audit Officer**, the cost of such **Work** computed in accordance with Article 26.2 above, plus an additional allowance of five (5%) percent to cover the **Contractor's** overhead and profit.

26.4 Where a change is ordered, involving both **Extra Work** and omitted or reduced **Contract Work**, the **Contract** price shall be adjusted, subject to pre-audit by the **EAO**, in an amount based on the difference between the cost of such **Extra Work** and of the omitted or reduced **Work**. The cost of such **Extra Work** and of such omitted or reduced **Work** shall be computed based upon applicable **Contract** unit prices. Where there are no applicable **Contract** unit prices, the cost of such **Extra Work** and of such omitted or reduced **Contract Work** shall be computed in accordance with items 26.2.1 through 26.2.8. If the cost of such **Extra Work** exceeds the costs of such omitted or reduced **Contract Work**, the **Contract** price shall be increased by the difference, plus percentages for overhead and profit as provided in Articles 26.2.9 through 26.2.11. If the cost of the omitted or reduced **Contract Work** exceeds the cost of the **Extra Work**, then the **Contract** price shall be reduced by the difference.

26.5 Where the **Contractor** and the **Commissioner** can agree upon a fixed price for **Extra Work** in accordance with Article 25.3.2 or another method of payment for **Extra Work** in accordance with Article 25.3.4, or for **Extra Work** ordered in connection with omitted work, such method, subject to pre-audit by the **EAO**, may, at the option of the **Commissioner**, be substituted for the cost plus a percentage method provided in Article 26.2; provided, however, that if the **Extra Work** is performed by a **Subcontractor**, the **Contractor** shall not be entitled to receive more than an additional allowance of five (5%) percent for overhead and profit over the cost of such **Subcontractor's Work** as computed in accordance with Article 26.2.

## **ARTICLE 27. RESOLUTION OF DISPUTES**

27.1 All disputes between the **City** and the **Contractor** of the kind delineated in this article that arise under, or by virtue of, this **Contract** shall be finally resolved in accordance with the provisions of this article and the **PPB Rules**. This procedure for resolving all disputes of the kind delineated herein shall be the exclusive means of resolving any such disputes.

27.1.1 This article shall not apply to disputes concerning matters dealt with in other sections of the **PPB Rules**, or to disputes involving patents, copyrights, trademarks, or trade secrets (as interpreted by the courts of New York State) relating to proprietary rights in computer software.

27.1.2 This article shall apply only to disputes about the scope of work delineated by the **Contract**, the interpretation of **Contract** documents, the amount to be paid for **Extra Work** or disputed work performed in connection with the **Contract**, the conformity of the **Contractor's Work** to the

**Contract**, and the acceptability and quality of the **Contractor's Work**; such disputes arise when the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** makes a determination with which the **Contractor** disagrees.

27.2 All determinations required by this article shall be made in writing clearly stated, with a reasoned explanation for the determination based on the information and evidence presented to the party making the determination. Failure to make such determination within the time required by this article shall be deemed a non-determination without prejudice that will allow application to the next level.

27.3 During such time as any dispute is being presented, heard, and considered pursuant to this article, the **Contract** terms shall remain in force and the **Contractor** shall continue to perform **Work** as directed by the **ACCO** or the **Engineer**. Failure of the **Contractor** to continue **Work** as directed shall constitute a waiver by the **Contractor** of its claim.

#### 27.4 Presentation of Disputes to Commissioner.

Notice of Dispute and Agency Response. The **Contractor** shall present its dispute in writing ("Notice of Dispute") to the **Commissioner** within thirty (30) Days of receiving written notice of the determination or action that is the subject of the dispute. This notice requirement shall not be read to replace any other notice requirements contained in the **Contract**. The Notice of Dispute shall include all the facts, evidence, documents, or other basis upon which the **Contractor** relies in support of its position, as well as a detailed computation demonstrating how any amount of money claimed by the **Contractor** in the dispute was arrived at. Within thirty (30) Days after receipt of the detailed written submission comprising the complete Notice of Dispute, the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** shall submit to the **Commissioner** all materials he or she deems pertinent to the dispute. Following initial submissions to the **Commissioner**, either party may demand of the other the production of any document or other material the demanding party believes may be relevant to the dispute. The requested party shall produce all relevant materials that are not otherwise protected by a legal privilege recognized by the courts of New York State. Any question of relevancy shall be determined by the **Commissioner** whose decision shall be final. Willful failure of the **Contractor** to produce any requested material whose relevancy the **Contractor** has not disputed, or whose relevancy has been affirmatively determined, shall constitute a waiver by the **Contractor** of its claim.

27.4.1 **Commissioner Inquiry.** The **Commissioner** shall examine the material and may, in his or her discretion, convene an informal conference with the **Contractor**, the **ACCO**, and the **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner** to resolve the issue by mutual consent prior to reaching a determination. The **Commissioner** may seek such technical or other expertise as he or she shall deem appropriate, including the use of neutral mediators, and require any such additional material from either or both parties as he or she deems fit. The **Commissioner's** ability to render, and the effect of, a decision hereunder shall not be impaired by any negotiations in connection with the disputed presented, whether or not the **Commissioner** participated therein. The **Commissioner** may or, at the request of any party to the dispute, shall compel the participation of any other **Contractor** with a **Contract** related to the **Work** of this **Contract**, and that **Contractor** shall be bound by the decision of the **Commissioner**. Any **Contractor** thus brought into the dispute resolution proceeding shall have the same rights and obligations under this article as the **Contractor** initiating the dispute.

27.4.2 **Commissioner Determination.** Within thirty (30) days after the receipt of all materials and information, or such longer time as may be agreed to by the parties, the **Commissioner** shall make his or her determination and shall deliver or send a copy of such determination to the **Contractor**, the **ACCO**, and **Engineer, Resident Engineer, Engineering Audit Officer**, or other designee of the **Commissioner**, as applicable, together with a statement concerning how the decision may be appealed.

27.4.3 Finality of **Commissioner** Decision. The **Commissioner's** decision shall be final and binding on all parties, unless presented to the Contract Dispute Resolution Board pursuant to this article. The **City** may not take a petition to the Contract Dispute Resolution Board. However, should the **Contractor** take such a petition, the **City** may seek, and the Contract Dispute Resolution Board may render, a determination less favorable to the **Contractor** and more favorable to the **City** than the decision of the **Commissioner**.

27.5 Presentation of Dispute to the **Comptroller**. Before any dispute may be brought by the **Contractor** to the Contract Dispute Resolution Board, the **Contractor** must first present its claim to the **Comptroller** for his or her review, investigation, and possible adjustment.

27.5.1 Time, Form, and Content of Notice. Within thirty (30) days of its receipt of a decision by the **Commissioner**, the **Contractor** shall submit to the **Comptroller** and to the **Commissioner** a Notice of Claim regarding its dispute with the **Agency**. The Notice of Claim shall consist of (i) a brief Written statement of the substance of the dispute, the amount of money, if any, claimed and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written decision of the **Commissioner**; and (iii) a copy of all materials submitted by the **Contractor** to the **Agency**, including the Notice of Dispute. The **Contractor** may not present to the **Comptroller** any material not presented to the **Commissioner**, except at the request of the **Comptroller**.

27.5.2 **Agency** Response. Within thirty (30) days of receipt of the Notice of Claim, the **Agency** shall make available to the **Comptroller** a copy of all material submitted by the **Agency** to the **Commissioner** in connection with the dispute. The **Agency** may not present to the **Comptroller** any material not presented to the **Commissioner** except at the request of the **Comptroller**.

27.5.3 **Comptroller** Investigation. The **Comptroller** may investigate the claim in dispute and, in the course of such investigation, may exercise all powers provided in section 7-201 and 7-203 of the New York City Administrative Code. In addition, the **Comptroller** may demand of either party, and such party shall provide, whatever additional material the **Comptroller** deems pertinent to the claim, including original business records of the **Contractor**. Willful failure of the **Contractor** to produce within fifteen (15) days any material requested by the **Comptroller** shall constitute a waiver by the **Contractor** of its claim. The **Comptroller** may also schedule an informal conference to be attended by the **Contractor**, **Agency** representatives, and any other personnel desired by the **Comptroller**.

27.5.4 Opportunity of **Comptroller** to Compromise or Adjust Claim. The **Comptroller** shall have forty-five (45) days from his or her receipt of all materials referred to in Article 27.5.3 to investigate the disputed claim. The period for investigation and compromise may be further extended by agreement between the **Contractor** and the **Comptroller**, to a maximum of ninety (90) days from the **Comptroller's** receipt of all materials. The **Contractor** may not present its petition to the Contract Dispute Resolution Board until the period for investigation and compromise delineated in Article 27.5.4 has expired. In compromising or adjusting any claim hereunder, the **Comptroller** may not revise or disregard the terms of the **Contract** between the parties.

27.6 Contract Dispute Resolution Board. There shall be a Contract Dispute Resolution Board composed of:

27.6.1 The chief administrative law judge of the Office of Administrative Trials and Hearings (OATH) or his/her designated OATH administrative law judge, who shall act as chairperson, and may adopt operational procedures and issue such orders consistent with this article as may be necessary in the execution of the Contract Dispute Resolution Board's functions, including, but not limited to, granting extensions of time to present or respond to submissions;

27.6.1.1 The **CCPO** or his/her designee; any designee shall have the requisite background to consider and resolve the merits of the dispute and shall not have participated personally and substantially in the particular matter that is the subject of the dispute or report to anyone who so participated; and

27.6.2 A person with appropriate expertise who is not an employee of the City. This person shall be selected by the presiding administrative law judge from a prequalified panel of individuals, established and administered by OATH with appropriate background to act as decision-makers in a dispute. Such individual may not have a contract or dispute with the City or be an officer or employee of any company or organization that does, or regularly represents persons, companies, or organizations having disputes with the City.

27.7 Petition to the Contract Dispute Resolution Board. In the event the claim has not been settled or adjusted by the **Comptroller** within the period provided in this article, the **Contractor**, within thirty (30) days thereafter, may petition the Contract Dispute Resolution Board to review the **Commissioner's** determination.

27.7.1 Form and Content of Petition by **Contractor**. The **Contractor** shall present its dispute to the Contract Dispute Resolution Board in the form of a petition, which shall include (i) a brief written statement of the substance of the dispute, the amount of money, if any, claimed, and the reason(s) the **Contractor** contends the dispute was wrongly decided by the **Commissioner**; (ii) a copy of the written Decision of the **Commissioner**, (iii) copies of all materials submitted by the **Contractor** to the Agency; (iv) a copy of the written decision of the **Comptroller**, if any, and (v) copies of all correspondence with, or written material submitted by the **Contractor**, to the **Comptroller**. The **Contractor** shall concurrently submit four (4) complete sets of the Petition: one set to the Corporation Counsel (Attn: Commercial and Real Estate Litigation Division) and three (3) sets to the Contract Dispute Resolution Board at OATH's offices with proof of service on the Corporation Counsel. In addition, the **Contractor** shall submit a copy of the written statement of the substance of the dispute, cited in (i) above, to both the **Commissioner** and the **Comptroller**.

27.7.2 Agency Response. Within thirty (30) Days of its receipt of the petition by the Corporation Counsel, the **Agency** shall respond to the brief written statement of the **Contractor** and make available to the Contract Dispute Resolution Board all material it submitted to the **Commissioner** and **Comptroller**. Three (3) complete copies of the **Agency** response shall be provided to the Contract Dispute Resolution Board and one to the **Contractor**. Extensions of time for submittal of the **Agency** response shall be given as necessary upon a showing of good cause or, upon consent of the parties, for an initial period of up to thirty (30) Days.

27.7.3 Further Proceedings. The Contract Dispute Resolution Board shall permit the **Contractor** to present its case by submission of memoranda, briefs, and oral argument. The Contract Dispute Resolution Board shall also permit the **Agency** to present its case in response to the **Contractor** by submission of memoranda, briefs, and oral argument. If requested by the Corporation Counsel, the **Comptroller** shall provide reasonable assistance in the preparation of the **Agency's** case. Neither the **Contractor** nor the **Agency** may support its case with any documentation or other material that was not considered by the **Comptroller**, unless requested by the Contract Dispute Resolution Board. The Contract Dispute Resolution Board, in its discretion, may seek such technical or other expert advice as it shall deem appropriate and may seek, on its own or upon application of a party, any such additional material from any party as it deems fit. The Contract Dispute Resolution Board, in its discretion, may combine more than one dispute between the parties for concurrent resolution.

27.7.4 Contract Dispute Resolution Board Determination. Within forty-five (45) Days of the conclusion of all written submissions and oral arguments, the Contract Dispute Resolution Board shall render a written decision resolving the dispute. In an unusually complex case, the Contract Dispute Resolution Board may render its decision in a longer period, not to exceed ninety (90) Days, and shall

so advise the parties at the commencement of this period. The Contract Dispute Resolution Board's decision must be consistent with the terms of the **Contract**. Decisions of the Contract Dispute Resolution Board shall only resolve matters before the Contract Dispute Resolution Board and shall not have precedential effect with respect to matters not before the Contract Dispute Resolution Board.

27.7.5 Notification of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board shall send a copy of its decision to the **Contractor**, the **ACCO**, the **Engineer**, the **Comptroller**, the Corporation Counsel, the Director of the Office of Construction, and the **PPB**. A decision in favor of the **Contractor** shall be subject to the prompt payment provisions of the **PPB** Rules. The Required Payment Date shall be thirty (30) Days after the date the parties are formally notified of the Contract Dispute Resolution Board's decision.

27.7.6 Finality of Contract Dispute Resolution Board Decision. The Contract Dispute Resolution Board's decision shall be final and binding on all parties. Any party may seek review of the Contract Dispute Resolution Board's decision solely in the form of a challenge, filed within four (4) months of the date of the Contract Dispute Resolution Board's decision, in a court of competent jurisdiction of the State of New York, County of New York pursuant to Article 78 of the Civil Practice Laws and Rules. Such review by the court shall be limited to the question of whether or not the Contract Dispute Resolution Board's decision was made in violation of lawful procedure, was affected by an error of Law, or was arbitrary and capricious or an abuse of discretion. No evidence or information shall be introduced or relied upon in such proceeding that was not presented to the Contract Dispute Resolution Board in accordance with this article.

27.8 Any termination, cancellation, or alleged breach of the **Contract** prior to or during the pendency of any proceedings pursuant to this article shall not affect or impair the ability of the **Commissioner** or Contract Dispute Resolution Board to make a binding and final decision pursuant to this article.

## **ARTICLE 28. RECORD KEEPING FOR EXTRA OR DISPUTED WORK**

28.1 While the **Contractor** or any of its **Subcontractors** is performing **Extra Work** on a Time and Material Basis ordered by the **Commissioner** under Article 25, or is performing **disputed Work**, or complying with a determination or order under protest in accordance with Articles 27 and 30, in each such case the **Contractor** shall furnish the **Resident Engineer** daily with three (3) copies of written statements signed by the **Contractor's** representative at the **Site** showing:

28.1.1 The name and number of each Worker employed on such **Work** or engaged in complying with such determination or order, the number of hours employed, and the character of the **Work** each is doing; and

28.1.2 The nature and quantity of any materials, plant and equipment furnished or used in connection with the performance of such **Work** or compliance with such determination or order, and from whom purchased or rented.

28.2 A copy of such statement will be countersigned by the **Resident Engineer**, noting thereon any items not agreed to or questioned, and will be returned to the **Contractor** within two (2) Days after submission.

28.3 The **Contractor** and its **Subcontractors**, when required by the **Commissioner**, or the **Comptroller**, shall also produce for inspection, at the office of the **Contractor** or **Subcontractor**, any and all of its books, bid documents, financial statements, vouchers, records, daily job diaries and reports, and cancelled checks, and any other documents relating to showing the nature and quantity of the labor, materials, plant and equipment actually used in the performance of such **Work**, or in complying with such determination or order, and the amounts

expended therefor, and shall permit the **Commissioner** and the **Comptroller** to make such extracts therefrom, or copies thereof, as they or either of them may desire.

28.4 In connection with the examination provided for herein, the **Commissioner**, upon demand therefor, will produce for inspection by the **Contractor** such records as the **Agency** may have with respect to such **Extra** or **disputed Work** performed under protest pursuant to order of the **Commissioner**, except those records and reports which may have been prepared for the purpose of determining the accuracy and validity of the **Contractor's** claim.

28.5 Failure to comply strictly with these requirements shall constitute a waiver of any claim for extra compensation or damages on account of the performance of such **Work** or compliance with such determination or order.

#### **ARTICLE 29. OMITTED WORK**

29.1 If any **Contract Work** in a lump sum **Contract**, or if any part of a lump sum item in a unit price, lump sum, or percentage-bid **Contract** is omitted by the **Commissioner** pursuant to Article 33, the **Contract** price, subject to audit by the EAO, shall be reduced by a pro rata portion of the lump sum bid amount based upon the percent of **Work** omitted subject to Article 29.4. For the purpose of determining the pro rata portion of the lump sum bid amount, the bid breakdown submitted in accordance with Article 41 shall be considered, but shall not be the determining factor.

29.2 If the whole of a lump sum item or units of any other item is so omitted by the **Commissioner** in a unit price, lump sum, or percentage-bid **Contract**, then no payment will be made therefor except as provided in Article 29.4.

29.3 For units that have been ordered but are only partially completed, the unit price shall be reduced by a pro rata portion of the unit price bid based upon the percentage of **Work** omitted subject to Article 29.4.

29.4 In the event the **Contractor**, with respect to any omitted **Work**, has purchased any non-cancelable material and/or equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated into the **Work**, the **Contractor** shall be paid for such material and/or equipment in accordance with Article 64.2.1(b); provided, however, such payment is contingent upon the **Contractor's** delivery of such material and/or equipment in acceptable condition to a location designated by the **City**.

29.5 The **Contractor** agrees to make no claim for damages or for loss of overhead and profit with regard to any omitted **Work**.

#### **ARTICLE 30. NOTICE AND DOCUMENTATION OF COSTS AND DAMAGES; PRODUCTION OF FINANCIAL RECORDS**

30.1 If the **Contractor** shall claim to be sustaining damages by reason of any act or omission of the **City** or its agents, it shall submit to the **Commissioner** within forty-five (45) **Days** from the time such damages are first incurred, and every thirty (30) **Days** thereafter for as long as such damages are incurred, verified statements of the details and the amounts of such damages, together with documentary evidence of such damages. The **Contractor** may submit any of the above statements within such additional time as may be granted by the **Commissioner** in writing upon written request therefor. Failure of the **Commissioner** to respond in writing to a written request for additional time within thirty (30) **Days** shall be deemed a denial of the request. On failure of the **Contractor** to fully comply with the foregoing provisions, such claims shall be deemed waived and no right to recover on such claims shall exist. Damages that the **Contractor** may claim in any action or dispute resolution procedure arising under or by reason of this **Contract** shall not be different from or in excess of the statements and documentation made pursuant to this article.

30.2 In addition to the foregoing statements, the **Contractor** shall, upon notice from the **Commissioner**, produce for examination at the **Contractor's** office, by the **Engineer, Architect or Project Manager**, all of its books of account, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**, and submit itself and persons in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.3 In addition to the statements required under Article 28 and this Article, the **Contractor** and/or its **Subcontractor** shall, within thirty (30) **Days** upon notice from the **Commissioner** or **Comptroller**, produce for examination at the **Contractor's** and/or **Subcontractor's** office, by a representative of either the **Commissioner** or **Comptroller**, all of its books of account, bid documents, financial statements, accountant workpapers, bills, invoices, payrolls, subcontracts, time books, daily reports, bank deposit books, bank statements, check books, cancelled checks, showing all of its acts and transactions in connection with or relating to or arising by reason of this **Contract**. Further, the **Contractor** and/or its **Subcontractor** shall submit any person in its employment, for examination under oath by any person designated by the **Commissioner** or **Comptroller** to investigate claims made or disputes against the **City** under this **Contract**. At such examination, a duly authorized representative of the **Contractor** may be present.

30.4 Unless the information and examination required under Article 30.3 is provided by the **Contractor** and/or its **Subcontractor** upon thirty (30) **Days** notice from the **Commissioner** or **Comptroller**, or upon the **Commissioner's** or **Comptroller's** written authorization to extend the time to comply, the **City** shall be released from all claims arising under, relating to or by reason of this **Contract**, except for sums certified by the **Commissioner** or **Comptroller** to be due under the provisions of this **Contract**. It is further stipulated and agreed that no person has the power to waive any of the foregoing provisions and that in any action or dispute resolution procedure against the **City** to recover any sum in excess of the sums certified by the **Commissioner** or **Comptroller** to be due under or by reason of this **Contract**, the **Contractor** must allege in its complaint and prove, at trial or during such dispute resolution procedure, compliance with the provisions of this Article.

30.5 In addition, after the commencement of any action or dispute resolution procedure by the **Contractor** arising under or by reason of this **Contract**, the **City** shall have the right to require the **Contractor** to produce for examination under oath, up until the trial of the action or hearing before the Contract Dispute Resolution Board, the books and documents described in Article 30.3 and submit itself and all persons in its employ for examination under oath. If this Article is not complied with as required, then the **Contractor** hereby consents to the dismissal of the action or dispute resolution procedure.

**CHAPTER VII**  
**POWERS OF THE RESIDENT ENGINEER,**  
**THE ENGINEER OR ARCHITECT AND THE COMMISSIONER**

**ARTICLE 31. THE RESIDENT ENGINEER**

31.1 The **Resident Engineer** shall have the power to inspect, supervise and control the performance of the **Work**, subject to review by the **Commissioner**. The **Resident Engineer** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

## **ARTICLE 32. THE ENGINEER OR ARCHITECT OR PROJECT MANAGER**

32.1 The **Engineer or Architect or Project Manager**, in addition to those matters elsewhere herein delegated to the **Engineer** and expressly made subject to his/her determination, direction or approval, shall have the power, subject to review by the **Commissioner**:

32.1.1 To determine the amount, quality, and location of the **Work** to be paid for hereunder; and

32.1.2 To determine all questions in relation to the **Work**, to interpret the **Contract Drawings, Specifications, and Addenda**, and to resolve all patent inconsistencies or ambiguities therein; and

32.1.3 To determine how the **Work** of this **Contract** shall be coordinated with **Work** of other **Contractors** engaged simultaneously on this **Project**, including the power to suspend any part of the **Work**, but not the whole thereof; and

32.1.4 To make minor changes in the **Work** as he/she deems necessary, provided such changes do not result in a net change in the cost to the **City** or to the **Contractor** of the **Work** to be done under the **Contract**; and

32.1.5 To amplify the **Contract Drawings**, add explanatory information and furnish additional **Specifications** and drawings, consistent with this **Contract**.

32.2 The foregoing enumeration shall not imply any limitation upon the power of the **Engineer or Architect or Project Manager**, for it is the intent of this **Contract** that all of the **Work** shall generally be subject to his/her determination, direction and approval, except where the determination, direction or approval of someone other than the **Engineer or Architect or Project Manager** is expressly called for herein.

32.3 The **Engineer or Architect or Project Manager** shall not, however, have the power to issue an **Extra Work** order, except as specifically designated in writing by the **Commissioner**.

## **ARTICLE 33. THE COMMISSIONER**

33.1 The **Commissioner**, in addition to those matters elsewhere herein expressly made subject to his/her determination, direction or approval, shall have the power:

33.1.1 To review and make determinations on any and all questions in relation to this **Contract** and its performance; and

33.1.2 To modify or change this **Contract** so as to require the performance of **Extra Work** (subject, however, to the limitations specified in Article 25) or the omission of **Contract Work**; and

33.1.3 To suspend the whole or any part of the **Work** whenever in his/her judgment such suspension is required:

33.1.3(a) In the interest of the **City** generally; or

33.1.3(b) To coordinate the **Work** of the various **Contractors** engaged on this **Project** to the provisions of Article 12; or

33.1.3(c) To expedite the completion of the entire **Project** even though the completion of this particular **Contract** may thereby be delayed.

## ARTICLE 34. NO ESTOPPEL

34.1 Neither the **City** nor any **Agency**, officer, agent or employee thereof, shall be bound, precluded or estopped by any determination, decision, approval, order, letter, payment or certificate made or given under or in connection with this **Contract** by the **City**, the **Commissioner**, the **Resident Engineer**, or any other officer, agent or employee of the **City**, either before or after the final completion and acceptance of the **Work** and payment therefor:

34.1.1 From showing the true and correct classification, amount, quality or character of the **Work** actually done; or that any such determination, decision, order, letter, payment or certificate was untrue, incorrect or improperly made in any particular, or that the **Work**, or any part thereof, does not in fact conform to the requirements of this **Contract**; and

34.1.2 From demanding and recovering from the **Contractor** any overpayment made to it, or such damages as the **City** may sustain by reason of the **Contractor's** failure to perform each and every part of its **Contract**.

## CHAPTER VIII LABOR PROVISIONS

### ARTICLE 35. EMPLOYEES

35.1 The **Contractor** and its **Subcontractors** shall not employ on the **Work**:

35.1.1 Anyone who is not competent, faithful and skilled in the **Work** for which he/she shall be employed; and whenever the **Commissioner** shall inform the **Contractor**, in writing, that any employee is, in his/her opinion, incompetent, unfaithful or disobedient, that employee shall be discharged from the **Work** forthwith, and shall not again be employed upon it; or

35.1.2 Any labor, materials or means whose employment, or utilization during the course of this **Contract**, may tend to or in any way cause or result in strikes, work stoppages, delays, suspension of **Work** or similar troubles by workers employed by the **Contractor** or its **Subcontractors**, or by any of the trades working in or about the buildings and premises where **Work** is being performed under this **Contract**, or by **Other Contractors** or their **Subcontractors** pursuant to other **Contracts**, or on any other building or premises owned or operated by the **City**, its **Agencies**, departments, boards or authorities. Any violation by the **Contractor** of this requirement may, upon certification of the **Commissioner**, be considered as proper and sufficient cause for declaring the **Contractor** to be in default, and for the **City** to take action against it as set forth in Chapter X of this **Contract**, or such other article of this **Contract** as the **Commissioner** may deem proper; or

35.1.3 In accordance with Section 220.3-e of the Labor Law of the State of New York (hereinafter "Labor Law"), the **Contractor** and its **Subcontractors** shall not employ on the **Work** any apprentice, unless he/she is a registered individual, under a bona fide program registered with the New York State Department of Labor. The allowable ratio of apprentices to journey-level workers in any craft classification shall not be greater than the ratio permitted to the **Contractor** as to its **Work** force on any job under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the wage rate determined by the **Comptroller** of the **City** for the classification of **Work** actually performed. The **Contractor** or **Subcontractor** will be required to furnish written evidence of the registration of its program and apprentices as well as all the appropriate ratios and wage rates, for the area of the construction prior to using any apprentices on the **Contract Work**.

35.2 If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand dollars, all laborers, workers, and mechanics employed in the performance of the **Contract** on the public work site, either by the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the work contemplated by the contract, shall be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States department of labor's occupational safety and health administration that is at least ten hours in duration.

### ARTICLE 36. NO DISCRIMINATION

36.1 The **Contractor** specifically agrees, as required by Labor Law Section 220-e, as amended, that:

36.1.1 In the hiring of employees for the performance of **Work** under this **Contract** or any subcontract hereunder, neither the **Contractor**, **Subcontractor**, nor any person acting on behalf of such **Contractor** or **Subcontractor**, shall by reason of race, creed, color or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the **Work** to which the employment relates;

36.1.2 Neither the **Contractor**, **Subcontractor**, nor any person on its behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this **Contract** on account of race, creed, color or national origin;

36.1.3 There may be deducted from the amount payable to the **Contractor** by the **City** under this **Contract** a penalty of fifty (\$50.00) dollars for each person for each **Day** during which such person was discriminated against or intimidated in violation of the provisions of this **Contract**; and

36.1.4 This **Contract** may be cancelled or terminated by the **City** and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this article.

36.1.5 The aforesaid provisions of this article covering every **Contract** for or on behalf of the State or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of New York.

36.2 The **Contractor** specifically agrees, as required by Section 6-108 of the Administrative Code, as amended, that:

36.2.1 It shall be unlawful for any person engaged in the construction, alteration or repair of buildings or engaged in the construction or repair of streets or highways pursuant to a **Contract** with the **City** or engaged in the manufacture, sale or distribution of materials, equipment or supplies pursuant to a **Contract** with the **City** to refuse to employ or to refuse to continue in any employment any person on account of the race, color or creed of such person.

36.2.2 It shall be unlawful for any person or any servant, agent or employee of any person, described in Article 36.1.2, to ask, indicate or transmit, orally or in writing, directly or indirectly, the race, color or creed or religious affiliation of any person employed or seeking employment from such person, firm or corporation.

36.2.3 Breach of the foregoing provisions shall be deemed a violation of a material provision of this **Contract**.

36.2.4 Any person, or the employee, manager or owner of or officer of such firm or corporation who shall violate any of the provisions of this section shall, upon conviction thereof, be punished by

a fine of not more than one hundred (\$100.00) dollars or by imprisonment for not more than thirty (30) Days, or both.

36.3 This **Contract** is subject to the requirements of Executive Order No. 50 (1980) ("E.O. 50"), as revised, and the Rules and Regulations promulgated thereunder. No **Contract** will be awarded unless and until these requirements have been complied with in their entirety. By signing this **Contract**, the **Contractor** agrees that it:

36.3.1 Will not engage in any unlawful discrimination against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability, marital status or sexual orientation with respect to all employment decisions including, but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoff, termination, and all other terms and conditions of employment; and

36.3.2 Will not engage in any unlawful discrimination in the selection of **Subcontractors** on the basis of the owner's race, color, creed, national origin, sex, age, disability, marital status or sexual orientation; and

36.3.3 Will state in all solicitations or advertisements for employees placed by or on behalf of the **Contractor** that all qualified applicants will receive consideration for employment without unlawful discrimination based on race, creed, color, national origin, sex, age, citizens status, disability, marital status, sexual orientation, or that it is an equal employment opportunity employer; and

36.3.4 Will send to each labor organization or representative of workers with which it has a Collective Bargaining Agreement or other Contract or memorandum of understanding, written notification of its equal employment opportunity commitments under E.O. 50 and the Rules and Regulations promulgated thereunder; and

36.3.5 Will furnish all information and reports including an Employment Report before the award of the **Contract** which are required by E.O. 50, the Rules and Regulations promulgated thereunder, and orders of the Department of Business Services, Division of Labor Services ("**DLS**") and will permit access to its books, records and accounts by the **DLS** for the purposes of investigation to ascertain compliance with such rules, regulations, and orders.

36.4 The **Contractor** understands that in the event of its noncompliance with the nondiscrimination clauses of this **Contract** or with any of such rules, regulations, or orders, such noncompliance shall constitute a material breach of this **Contract** and noncompliance with E.O. 50 and the Rules and Regulations promulgated thereunder. After a hearing held pursuant to the rules of the **DLS**, the Director of the **DLS** may direct the **Commissioner** to impose any or all of the following sanctions:

36.4.1 Disapproval of the **Contractor**; and/or

36.4.2 Suspension or termination of the **Contract**; and/or

36.4.3 Declaring the **Contractor** in default; and/or

36.4.4 In lieu of any of the foregoing sanctions, the Director of the **DLS** may impose an employment program.

Failure to comply with E.O. 50 and the rules and regulations promulgated thereunder, in one or more instances, may result in the **Agency** declaring the **Contractor** to be non-responsible.

The **Contractor** further agrees that it will refrain from entering into any **Contract** or **Contract** modification subject to E.O. 50 and the rules and regulations promulgated thereunder with a **Subcontractor** who is not in compliance with the requirements of E.O. 50 and the rules and regulations promulgated thereunder.

36.5 The **Contractor** specifically agrees, as required by Section 6-123 of the Administrative Code, that:

36.5.1 The **Contractor** will not engage in any unlawful discriminatory practice in violation of Title VIII of the Administrative Code;

36.5.2 every agreement between the **Contractor** and its **Subcontractors** in excess of \$50,000 shall include a provision that the **Subcontractor** shall not engage in any unlawful discriminatory practice as defined in title viii of the Administrative Code (Section 8-101 et. seq.); and

36.5.3 Any failure to comply with this Article 36.5 may subject the **Contractor** to the remedies set forth in Section 6-123 of the Administrative Code, including, where appropriate, sanctions such as withholding of payment, imposition of an employment program, finding the **Contractor** to be in default, cancellation of the **Contract**, or any other sanction or remedy provided by **Law** or **Contract**.

#### ARTICLE 37. LABOR LAW REQUIREMENTS

37.1 The **Contractor** shall strictly comply with all applicable provisions of the Labor Law, as amended. Such compliance is a material term of this **Contract**.

37.2 The **Contractor** specifically agrees, as required by Labor Law Section 220 and 220-d, as amended, that:

37.2.1 **Hours of Work:** No laborer, worker, or mechanic in the employ of the **Contractor**, **Subcontractor** or other person doing or contracting to do the whole or a part of the **Work** contemplated by this **Contract** shall be permitted or required to work more than eight (8) hours in any one (1) calendar **Day**, or more than five (5) **Days** in any one (1) week, except as provided in the Labor Law and in cases of extraordinary emergency including fire, flood, or danger to life or property, or in the case of national emergency when so proclaimed by the President of the United States of America.

37.2.2 In situations in which there are not sufficient laborers, workers and mechanics who may be employed to carry on expeditiously the **Work** contemplated by this **Contract** as a result of such restrictions upon the number of hours and days of labor, and the immediate commencement or prosecution or completion without undue delay of the **Work** is necessary for the preservation of the **Site** and/or for the protection of the life and limb of the persons using the same, such laborers, workers, and mechanics shall be permitted or required to work more than eight (8) hours in any one (1) **Day**; or five (5) **Days** in any one (1) week; provided, however, that upon application of any **Contractor**, the **Commissioner** shall have first certified to the Commissioner of Labor of the State of New York (hereinafter "Commissioner of Labor") that such public **Work** is of an important nature and that a delay in carrying it to completion would result in serious disadvantage to the public; and provided, further, that such Commissioner of Labor shall have determined that such an emergency does in fact exist as provided in Labor Law Section 220.2.

37.2.3 Failure of the **Commissioner** to make such a certification to the Commissioner of Labor shall not entitle the **Contractor** to damages for delay or for any cause whatsoever.

37.2.4 **Prevailing Rate of Wages:** The wages to be paid for a legal day's **Work** to laborers, workers, or mechanics employed upon the **Work** contemplated by this **Contract** or upon any materials to be used thereon shall not be less than the "prevailing rate of wage" as defined in Labor Law Section 220, and as fixed by the **Comptroller** in the attached Schedule of Wage Rates and in updated schedules thereof. The prevailing wage rates and supplemental benefits to be paid are those in effect at the time the **Work** is being performed.

37.2.5 Requests for interpretation or correction in the Information for Bidders includes all requests for clarification of the classification of trades to be employed in the performance of the **Work** under this **Contract**. In the event that a trade not listed in the **Contract** is in fact employed during the performance of this **Contract**, the **Contractor** shall be required to obtain from the **Agency** the prevailing wage rates and supplementary benefits for the trades used and to complete the performance of this **Contract** at the price at which the **Contract** was awarded.

37.2.6 **Minimum Wages:** Except for employees whose wage is required to be fixed pursuant to Labor Law Section 220, all persons employed by the **Contractor** and any **Subcontractor** in the manufacture or furnishing of the supplies, materials, or equipment, or the furnishing of work, labor, or services, used in the performance of this **Contract**, shall be paid, without subsequent deduction or rebate unless expressly authorized by **Law**, not less than the sum mandated by **Law**. Minimum wages shall be the rates fixed by Federal **Law** and regulations.

37.3 **Working Conditions:** No part of the **Work**, labor or services shall be performed or rendered by the **Contractor** in any plants, factories, buildings or surroundings or under working conditions which are unsanitary or hazardous or dangerous to the health and safety of employees engaged in the performance of this **Contract**. Compliance with the safety, sanitary and factory inspection **Laws** of the state in which the **Work** is to be performed shall be prima facie evidence of compliance with this article.

37.4 **Prevailing Wage Enforcement:** The **Contractor** agrees to pay for all costs incurred by the **City** in enforcing prevailing wage requirements, including the cost of any investigation conducted by or on behalf of the **Agency** or the **Comptroller**, where the **City** discovers a failure to comply with any of the requirements of this Article 37 by the **Contractor** or its **Subcontractor(s)**. The **Contractor** also agrees, that should it fail or refuse to pay for any such investigation, the **Agency** is hereby authorized to deduct from a **Contractor's** account an amount equal to the cost of such investigation.

37.4.1 The Labor Law Section 220 and Section 220-d, as amended, provide that this **Contract** shall be forfeited and no sum paid for any **Work** done hereunder on a second conviction for willfully paying less than:

37.4.1(a) The stipulated wage scale as provided in Labor Law Section 220, as amended, or

37.4.1(b) Less than the stipulated minimum hourly wage scale as provided in Labor Law Section 220-d, as amended.

37.4.2 For any breach or violation of either Working Conditions (Article 37.3) and Minimum Wages (Article 37.2.6), the party responsible therefore shall be liable to the **City** for liquidated damages, which may be withheld from any amounts due on any **Contracts** with the **City** of such party responsible, or may be recovered in suits brought by the Corporation Counsel in the name of the **City**, in addition to damage for any other breach of this **Contract**, a sum equal to the amount of any underpayment of wages due to any employee engaged in the performance of this **Contract**. In addition, the **Commissioner** shall have the right to cancel **Contracts** and enter into other **Contracts** for the completion of the original **Contract**, with or without public letting, and the original **Contractor** shall be liable for any additional cost. All sums withheld or recovered as deductions, rebates, refunds, or underpayment of wages hereunder, shall be held in a special deposit account and

shall be paid without interest, on order of the **Comptroller**, directly to the employees who have been paid less than minimum rates of pay as set forth herein and on whose account such sums were withheld or recovered, provided that no claims by employees for such payments shall be entertained unless made within two (2) years from the date of actual notice to the **Contractor** of the withholding or recovery of such sums by the **City**.

37.4.3 A determination by the **Comptroller** that a **Contractor** and/or its **Subcontractor** willfully violated Labor Law Section 220 will be forwarded to the **City's** five District Attorneys for review.

37.4.4 The **Contractor's** or **Subcontractor's** noncompliance with this article and Labor Law Section 220, may result in an unsatisfactory performance evaluation and the **Comptroller** may also find and determine that the **Contractor** or **Subcontractor** willfully violated the New York Labor Law.

37.4.4(a) An unsatisfactory performance evaluation for noncompliance with this article may result in a determination that the **Contractor** is a non-responsible bidder on subsequent procurements with the **City** and thus a rejection of a future award of a contract with the **City**, as well as any other sanctions provided for by Law.

37.4.4(b) Labor Law Section 220-b, as amended, provides that when two (2) final determinations have been rendered against a **Contractor** or **Subcontractor** within any consecutive six (6) year period determining that such **Contractor** or **Subcontractor** has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with the Labor Law and this article, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public work projects are rendered simultaneously, such **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public work contract with the **City** for a period of five (5) years from the second final determination. If the final determination involves the falsification of payroll records or the kickback of wages or supplements, the **Contractor** or **Subcontractor** shall be ineligible to submit a bid on or be awarded any public work contract with the **City** for a period of five (5) years from the first final determination.

37.4.4(c) Labor Law Section 220, as amended, provides that the **Contractor** or **Subcontractor** found to have violated this article may be directed to make payment of wages or supplements including interest found to be due, and the **Contractor** or **Subcontractor** may be directed to make payment of a further sum as a civil penalty in an amount not exceeding twenty-five (25%) percent of the total amount found to be due.

37.5 The **Contractor** and its **Subcontractors** shall within ten (10) **Days** after mailing of a Notice of Award or written order, post in prominent and conspicuous places in each and every plant, factory, building, and structure where employees of the **Contractor** and its **Subcontractors** engaged in the performance of this **Contract** are employed, notices furnished by the **City**, in relation to prevailing wages and supplements, minimum wages and other stipulations contained in Sections 220 and 220-h of the Labor Law, and the **Contractor** and its **Subcontractors** shall continue to keep such notices posted in such prominent and conspicuous places until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services required to be furnished or rendered under this **Contract**.

37.6 The **Contractor** shall strictly comply with all of the provisions of Articles 37.6.1 through 37.6.5, and provide for all workers, laborers or mechanics in its employ, the following:

37.6.1 **Notices Posted At Site:** Post, in a location designated by the **City**, schedules of prevailing wages and supplements for this **Project**, a copy of all re-determinations of such schedules for the

**Project**, the Workers' Compensation Law Section 51 notice, all other notices required by law to be posted at the **Site**, the **City** notice that this **Project** is a public works **Project** on which each worker is entitled to receive the prevailing wages and supplements for the occupation at which he or she is working, and all other notices which the **City** directs the **Contractor** to post. The **Contractor** shall provide a surface for such notices which is satisfactory to the **City**. The **Contractor** shall maintain and keep current such notices in a legible manner and shall replace any notice or schedule which is damaged, defaced, illegible or removed for any reason. The **Contractor** shall post such notices before commencing any **Work** on the **Site** and shall maintain such notices until all **Work** on the **Site** is complete; and

37.6.2 **Daily Site Sign-in Sheets:** Maintain daily **Site** sign-in sheets, and require that **Subcontractors** maintain daily **Site** sign-in sheets for its employees, which include blank spaces for an employee's name to be both printed and signed, job title, date started and Social Security number, the time the employee began **Work** and the time the employee left **Work**, until **Final Acceptance** of the supplies, materials, equipment, or **Work**, labor, or services to be furnished or rendered under this **Contract** unless exception is granted by the Comptroller upon application by the **Agency**. In the alternative, subject to the approval of the CCPO, the **Contractor** and **Subcontractor** may maintain an electronic or biometric sign-in system, which provides the information required by this Article 37.6.2; and

37.6.3 **Individual Employee Information Notices:** Distribute a notice, to each worker, laborer or mechanic employed under this **Contract**, in a form provided by the **Agency**, that this **Project** is a public work project on which each worker, laborer or mechanic is entitled to receive the prevailing rate of wages and supplements for the occupation at which he or she is working. If the total cost of the **Work** under this **Contract** is at least two hundred fifty thousand dollars, such notice shall also include a statement that, that each worker, laborer or mechanic be certified prior to performing any **Work** as having successfully completed a course in construction safety and health approved by the United States department of labor's occupational safety and health administration that is at least ten hours in duration. Such notice shall be distributed to each worker before he or she starts performing any **Work** of this **Contract** and with the first paycheck after July first of each year. Worker, laborer or mechanic includes employees of the **Contractor** and all **Subcontractors** and all employees of suppliers entering the **Site**. At the time of distribution, the **Contractor** shall have each worker, laborer or mechanic sign a statement, in a form provided by the **Agency**, certifying that the worker has received the notice required by this article, which signed statement shall be maintained with the payroll records required by this **Contract**; and

37.6.3.1 The **Contractor** and each **Subcontractor** shall notify each worker, laborer or mechanic employed under this **Contract** in writing of the prevailing rate of wages for their particular job classification. Such notification shall be given to every worker, laborer and mechanic on their first pay stub and with every pay stub thereafter; and

37.6.4 **Site Laminated Identification Badges:** Provide laminated identification badges which indicate the worker's, laborer's or mechanic's name, trade, employer's name and employment starting date (month/day/year). Further, require as a condition of employment on the **Site**, that each and every worker, laborer or mechanic wear the laminated identification badge at all times and that it may be seen by any representative of the **City**; and

37.6.5 **Language Other Than English Used On Site:** Provide the **ACCO** notice when three (3) or more employees (worker and/or laborer and/or mechanic) on the **Site**, at any time, speak a language other than English. The **ACCO** will then provide the **Contractor** the notices in Article 37.6.1 in that language or languages as may be required. The **Contractor** is responsible for all distributions under Article 37; and

37.6.6 Provision of Records: The **Contractor** and **Subcontractor(s)** shall produce within five (5) **Days** on the **Site** of the **Work** and upon a written order of the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, or the **Comptroller**, such records as are required to be kept by this Article 37.6; and

37.6.7 If this **Contract** is for an amount greater than \$1,000,000, checks issued by the **Contractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**). For any subcontract for an amount greater than \$750,000, checks issued by a **Subcontractor** to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the **Agency**); and

37.6.8 The failure of the **Contractor** or **Subcontractor(s)** to comply with the provisions of Articles 37.6.1 through 37.6.7 may result in the **Commissioner** declaring the **Contractor** or **Subcontractor(s)** in default and/or the withholding of payments otherwise due under the **Contract**.

37.7 The **Contractor** and its **Subcontractors** shall keep such employment and payroll records as are required by Section 220 of the **Labor Law**.

37.8 At the time the **Contractor** makes application for each partial payment and for final payment, the **Contractor** shall submit to the **Commissioner** a written payroll certification, in the form provided by this **Contract**, of compliance with the prevailing wage, minimum wage and other provisions and stipulations required by **Labor Law** Section 220 and of compliance with the training requirements of **Labor law** section 220-h set forth in Article 35.2. This certification of compliance with the provisions of this article shall be a condition precedent to payment and no payment shall be made to the **Contractor** unless and until each such certification shall have been submitted to and received by the **Commissioner**.

37.9 This **Contract** is executed by the **Contractor** with the express warranty and representation that the **Contractor** is not disqualified under the provisions of Section 220 of the **Labor Law** for the award of the **Contract**.

37.10 Any breach or violation of any of the foregoing shall be deemed a breach or violation of a material provision of this **Contract**, and grounds for cancellation thereof by the **City**.

#### **ARTICLE 38. PAYROLL REPORTS**

38.1 The **Contractor** shall maintain on the **Site** the original payrolls or transcripts thereof which the **Contractor** and its **Subcontractor(s)** are required to maintain pursuant to **Labor Law** Section 220. The **Contractor** and **Subcontractor(s)** shall submit original payrolls or transcripts, subscribed and affirmed by it as true, with each and every payment requisition. The **Contractor** and **Subcontractor(s)** shall produce within five (5) **Days** on the **Site** of the **Work** and upon a written order of the **Engineer**, the **Commissioner**, the **ACCO**, the **Agency EAO**, or the **Comptroller**, such original payrolls or transcripts thereof, subscribed and affirmed by it as true, and the statements signed by each worker pursuant to this Chapter VIII. In addition, the **Contractor** and **Subcontractor(s)** shall furnish to the **Engineer** upon written demand any other information to satisfy the **Engineer** that this Chapter VIII and the **Labor Law**, as to the hours of employment and rates of wages, are being observed. The **Contractor** shall maintain the payrolls or transcripts thereof for six (6) years from the date of completion of the **Work** on this **Contract**.

38.2 When directed by the **Engineer**, the **Contractor** or **Subcontractor** shall provide the **Engineer** with an attendance sheet for each **Day** on which **Work** is performed on the **Site**. Such attendance sheet shall be in a form acceptable to the **Agency** and shall provide information for employees of the **Contractor** and **Subcontractor(s)**.

### ARTICLE 39. DUST HAZARDS

39.1 Should a harmful dust hazard be created in performing the **Work** of this **Contract**, for the elimination of which appliances or methods have been approved by the Board of Standards and Appeals of the City of New York, such appliances and methods shall be installed, maintained, and effectively operated during the continuance of such harmful dust hazard. Failure to comply with this provision after notice shall make this **Contract** void.

## CHAPTER IX PARTIAL AND FINAL PAYMENTS

### ARTICLE 40. CONTRACT PRICE

40.1 The **City** shall pay, and the **Contractor** agrees to accept, in full consideration for the **Contractor's** performance of the **Work** subject to the terms and conditions hereof, the lump sum price or unit prices which this **Contract** was awarded, plus the amount required to be paid for any **Extra Work** ordered by the **Commissioner** under Article 25, less credit for any **Work** omitted pursuant to Article 29.

### ARTICLE 41. BID BREAKDOWN ON LUMP SUM

41.1 Within fifteen (15) **Days** after the commencement date specified in the Notice to Proceed, unless otherwise directed by the **Resident Engineer**, the **Contractor** shall submit to the **Resident Engineer** a breakdown of its bid price, or of lump sums bid for items of the **Contract**, showing the various operations to be performed under the **Contract**, as directed in the progress schedule required under Article 9, and the value of each of such operations, the total of such items to equal the lump sum price bid. Said breakdown must be approved in writing by the **Resident Engineer**.

41.2 No partial payment will be approved until the **Contractor** submits a bid breakdown that is acceptable to the **Resident Engineer**.

41.3 The **Contractor** shall also submit such other information relating to the bid breakdown as directed by the **Resident Engineer**. Thereafter, the breakdown may be used only for checking the **Contractor's** applications for partial payments hereunder, but shall not be binding upon the **City**, the **Commissioner**, or the **Engineer** for any purpose whatsoever.

### ARTICLE 42. PARTIAL PAYMENTS

42.1 From time to time as the **Work** progresses satisfactorily, but not more often than once a month, the **Contractor** may submit to the **Engineer** a requisition for a partial payment in the prescribed form, which shall contain an estimate of the quantity and the fair value of the **Work** done during the payment period.

42.2 Partial payments may be made for materials, fixtures and equipment in advance of their actual incorporation in the **Work**, as the **Commissioner** may approve, and upon the terms and conditions set forth in the General Conditions.

42.3 The **Contractor** shall also submit to the **Commissioner** in connection with every application for partial payment a verified statement in the form prescribed by the **Comptroller** setting forth the information required under Labor Law Section 220-a.

42.4 Within thirty (30) Days after receipt of such satisfactory payment application, the **Engineer** will prepare and certify, and the **Commissioner** will approve, a voucher for a partial payment in the amount of such approved estimate, less any and all deductions authorized to be made by the **Commissioner** under the terms of this **Contract** or by **Law**.

#### **ARTICLE 43. PROMPT PAYMENT**

43.1 The Prompt Payment provisions of the **PPB Rules** in effect at the time of the Bid will be applicable to payments made under this **Contract**. The provisions require the payment to **Contractor** of interest on payments made after the required payment date, except as set forth in the **PPB Rules**.

43.2 The **Contractor** shall submit a proper invoice to receive payment, except where the **Contract** provides that the **Contractor** will be paid at predetermined intervals without having to submit an invoice for each scheduled payment.

43.3 Determination of interest due will be made in accordance with the **PPB Rules**.

43.4 If the **Contractor** is paid interest, the proportionate share of that interest shall be forwarded by the **Contractor** to its **Subcontractor(s)**.

43.5 The **Contractor** shall pay each **Subcontractor** or **Materialman** not later than seven (7) Days after receipt of payment out of amounts paid to the **Contractor** by the **City** for **Work** performed by the **Subcontractor** or **Materialman** under this **Contract**.

43.5.1 If **Contractor** fails to make any payment to any **Subcontractor** or **Materialman** within seven (7) days after receipt of payment by the **City** pursuant to section 43.5 herein, then the **Contractor** shall pay interest on amounts due to such **Subcontractor** or **Materialman** at a rate of interest in effect on the date such payment is made by the **Contractor** computed in accordance with section 756-b (1)(b) of the NY General Business Law. Accrual of interest shall commence on the day immediately following the expiration of the seventh day following receipt of payment to the **Contractor** by the **City** and shall end on the date on which payment is made.

43.6 The **Contractor** shall include in each of its subcontracts a provision requiring each **Subcontractor** to make payment to each of its **Subcontractors** or suppliers for **Work** performed under this **Contract** in the same manner and within the same time period set forth above.

#### **ARTICLE 44. SUBSTANTIAL COMPLETION PAYMENT**

44.1 When the **Work** in the opinion of the **Commissioner**, has been substantially but not entirely completed, he/she shall issue a certificate of **Substantial Completion**.

44.2 The **Contractor** shall submit with the **Substantial Completion** requisition:

44.2.1 A Final Verified Statement of any and all alleged claims against the **City** and any pending dispute resolution procedures in accord with the **PPB Rules** and this **Contract**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30) setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the **Contractor** claims the performance of the **Work** or a particular

part thereof was delayed, and an itemized statement and breakdown of the amount claimed for each such delay.

44.2.1(a) With respect to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the Corporation Counsel of the **City** shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this article is intended to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor** upon acceptance of the **Substantial Completion** payment pursuant to this article, will have waived any such claims.

44.2.2 A Final Approved Punch List.

44.2.3 Where required, a request for a substantial or final extension of time.

44.3 The **Commissioner** shall issue a voucher calling for payment of any part or all of the balance due for **Work** performed under the **Contract**, including monies retained under Article 21, less any and all deductions authorized to be made by the **Commissioner**, under this **Contract** or by **Law**, and less twice the amount the **Commissioner** considers necessary to ensure the completion of the balance of the **Work** by the **Contractor**. Such a payment shall be considered a Partial and not a Final Payment. No **Substantial Completion** payment shall be made under this article where the **Contractor** shall fail to complete the **Work** within the time fixed for such completion in the Schedule A of the General Conditions, or within the time to which completion may have been extended, until an extension or extensions of time for the completion of **Work** have been acted upon pursuant to Article 13.

44.4 No further partial payments shall be made to the **Contractor** after the **Commissioner** issues a Certificate of **Substantial Completion**, except the **Substantial Completion** payment and **Contractor's** requisition that were properly filed with the **Commissioner** prior to the date of **Substantial Completion**; however, the **Commissioner** may grant a waiver for further partial payments after the date of **Substantial Completion** to permit payments for change order **Work** and/or release of retainage and deposits pursuant to Articles 21 and 24. Such waiver shall be in writing.

44.5 The **Contractor** acknowledges that nothing contained in this article is intended to or shall in any way diminish the force and effect of Article 13.

#### ARTICLE 45. FINAL PAYMENT

45.1 After completion and **Final Acceptance** of the **Work**, the **Contractor** shall submit all required certificates and documents, together with a requisition for the balance claimed to be due under the **Contract**, less the amount authorized to be retained for maintenance under Article 24. A verified statement similar to that required in connection with applications for partial payments shall also be submitted to the **Commissioner**.

45.2 Amended Verified Statement of Claims: The **Contractor** shall also submit with the final requisition any amendments to the final verified statement of any and all alleged claims against the **City**, and any pending dispute resolution procedures in accord with the **PPB Rules** and this **Contract**, in any way connected with or arising out of this **Contract** (including those as to which details may have been furnished pursuant to Articles 11, 27, 28, and 30.) that have occurred subsequent to **Substantial Completion**, setting forth with respect to each such claim the total amount thereof, the various items of labor and materials included therein, and the alleged value of each such item; and if the alleged claim be one for delay, the alleged cause of each such delay, the period or periods of time, giving the dates when the **Contractor** claims the performance of the **Work** or a particular part thereof was

delayed, and an itemized statement and breakdown of the amount claimed for each such delay. With reference to each such claim, the **Commissioner**, the **Comptroller** and, in the event of litigation, the Corporation Counsel of the **City** shall have the same right to inspect, and to make extracts or copies of, the **Contractor's** books, vouchers, records, etc., as is referred to in Articles 11, 27, 28, and 30. Nothing contained in this article, is entitled to or shall relieve the **Contractor** from the obligation of complying strictly with Articles 11, 27, 28, and 30. The **Contractor** is warned that unless such claims are completely set forth as herein required, the **Contractor**, upon acceptance of the Final Payment pursuant to Article 46, will have waived any such claims.

45.3 Preparation of Final Voucher: Upon determining the balance due hereunder other than on account of claims, the **Engineer** will prepare and certify, for the Commissioner's approval, a voucher for final payment in that amount less any and all deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**. In the case of a lump sum **Contract**, the **Commissioner** shall certify the voucher for final payment within thirty (30) **Days** from the date of completion and acceptance of the **Work**, provided all requests for extensions of time have been acted upon.

45.3.1 All prior certificates and vouchers upon which partial payments were made, being merely estimates made to enable the **Contractor** to prosecute the **Work** more advantageously, shall be subject to correction in the final voucher, and the certification of the **Engineer** thereon and the approval of the **Commissioner** thereof, shall be conditions precedent to the right of the **Contractor** to receive any money hereunder. Such final voucher shall be binding and conclusive upon the **Contractor**.

45.3.2 Payment pursuant to such final voucher, less any deductions authorized to be made by the **Commissioner** under this **Contract** or by **Law**, shall constitute the final payment, and shall be made by the **Comptroller** within thirty (30) **Days** after the filing of such voucher in his/her office.

45.4 The **Contractor** acknowledges that nothing contained in this article is intended to or shall in any way diminish the force and effect of Article 13.

#### **ARTICLE 46. ACCEPTANCE OF FINAL PAYMENT**

46.1 The acceptance by the **Contractor**, or by anyone claiming by or through it, of the final payment, whether such payment be made pursuant to any judgment of any Court, or otherwise, shall constitute and operate as a release to the **City** from any and all claims of and liability to the **Contractor** for anything heretofore done or furnished for the **Contractor** relating to or arising out of this **Contract** and the **Work** done hereunder, and for any prior act, neglect or default on the part of the **City** or any of its officers, agents or employees, excepting only a claim against the **City** for the amounts deducted or retained in accordance with the terms and provisions of this **Contract** or by **Law**, and excepting any claims, not otherwise waived, or any pending dispute resolution procedures which are contained in the verified statement filed with the **Contractor's** substantial and final requisitions pursuant to Articles 44 and 45.

46.2 The **Contractor** is warned that the execution by it of a release, in connection with the acceptance of the final payment, containing language purporting to reserve claims other than those herein specifically excepted from the operation of this article, or those for amounts deducted by the **Commissioner** from the final requisition or by the **Comptroller** from the final payment as certified by the **Engineer** and approved by the **Commissioner**, shall not be effective to reserve such claims, anything stated to the **Contractor** orally or in writing by any officer, agent or employee of the **City** to the contrary notwithstanding.

46.3 Should the **Contractor** refuse to accept the final payment as tendered by the **Comptroller**, it shall constitute a waiver of any right to interest thereon.

46.4 The **Contractor**, however, shall not be barred from commencing an action for breach of **Contract** under this provision to the extent permitted by **Law** and by the terms of the **Contract** provided that a detailed and verified statement of claim is served upon the contracting **Agency** and **Comptroller** not later than forty (40) **Days** after the mailing of such final payment. The statement shall specify the items upon which the claim will be based and any such claim shall be limited to such items.

#### **ARTICLE 47. APPROVAL BY PUBLIC DESIGN COMMISSION**

47.1 All works of art, including paintings, mural decorations, stained glass, statues, bas-reliefs and other sculptures, monuments, fountains, arches, and other structures of a permanent character intended for ornament or commemoration, and every design of the same to be used in the performance of this **Contract**, and the design of all bridges, approaches, buildings, gates, fences, lamps, or structures to be erected, pursuant to the terms of this **Contract**, shall be submitted to the Art Commission, d/b/a the Public Design Commission of the City of New York, and shall be approved by the Public Design Commission prior to the erection or placing in the position of the same. The final payment shall not become due or payable under this **Contract** unless and until the Public Design Commission shall certify that the design for the **Work** herein contracted for has been approved by the said Public Design Commission, and that the same has been executed in substantial accordance with the design so approved, pursuant to the provisions of Chapter 37, Section 854 of the **City Charter**, as amended.

### **CHAPTER X CONTRACTOR'S DEFAULT**

#### **ARTICLE 48. COMMISSIONER'S RIGHT TO DECLARE CONTRACTOR IN DEFAULT**

48.1 In addition to those instances specifically referred to in other Articles herein, the **Commissioner** shall have the right to declare the **Contractor** in default of this **Contract** if:

48.1.1 The **Contractor** fails to commence **Work** when notified to do so by the **Commissioner**; or if

48.1.2 The **Contractor** shall abandon the **Work**; or if

48.1.3 The **Contractor** shall refuse to proceed with the **Work** when and as directed by the **Commissioner**; or if

48.1.4 The **Contractor** shall, without just cause, reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the **Commissioner**, to complete the **Work** in accordance with the Progress Schedule; or if

48.1.5 The **Contractor** shall fail or refuse to increase sufficiently such working force when ordered to do so by the **Commissioner**; or if

48.1.6 The **Contractor** shall sublet, assign, transfer, convert or otherwise dispose of this **Contract** other than as herein specified; or sell or assign a majority interest in the **Contractor**; or if

48.1.7 The **Contractor** fails to secure and maintain all required insurance; or if

48.1.8 A receiver or receivers are appointed to take charge of the **Contractor's** property or affairs; or if

48.1.9 The **Commissioner** shall be of the opinion that the **Contractor** is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the **Work**, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if

48.1.10 The **Commissioner** shall be of the opinion that the **Contractor** is or has been willfully or in bad faith violating any of the provisions of this **Contract**; or if

48.1.11 The **Commissioner** shall be of the opinion that the **Work** cannot be completed within the time herein provided therefor or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the **Commissioner's** opinion, attributable to conditions within the **Contractor's** control; or if

48.1.12 The **Work** is not completed within the time herein provided therefor or within the time to which the **Contractor** may be entitled to have such completion extended; or if

48.1.13 Any statement or representation of the **Contractor** in the **Contract** or in any document submitted by the **Contractor** with respect to the **Work**, the **Project**, or the **Contract** (or for purposes of securing the **Contract**) was untrue or incorrect when made.

48.1.14 The **Contractor** or any of its officers, directors, partners, five (5%) percent shareholders, principals, or other persons substantially involved in its activities, commits any of the acts or omissions specified as the grounds for debarment in the **PPB Rules**.

48.2 Before the **Commissioner** shall exercise his/her right to declare the **Contractor** in default, the **Commissioner** shall give the **Contractor** an opportunity to be heard, upon not less than two (2) **Days** notice.

#### **ARTICLE 49. EXERCISE OF THE RIGHT TO DECLARE DEFAULT**

49.1 The right to declare in default for any of the grounds specified or referred to in Article 48 shall be exercised by sending the **Contractor** a notice, signed by the **Commissioner**, setting forth the ground or grounds upon which such default is declared (hereinafter referred to as a "Notice of Default").

49.2 The **Commissioner's** determination that the **Contractor** is in default shall be conclusive, final and binding on the parties and such a finding shall preclude the **Contractor** from commencing a plenary action for any damages relating to the **Contract**. If the **Contractor** protests the determination of the **Commissioner**, the **Contractor** may commence a lawsuit in a court of competent jurisdiction of the State of New York under Article 78 of the New York Civil Practice Law and Rules.

#### **ARTICLE 50. QUITTING THE SITE**

50.1 Upon receipt of such notice the **Contractor** shall immediately discontinue all further operations under this **Contract** and shall immediately quit the **Site**, leaving untouched all plant, materials, equipment, tools and supplies then on the **Site**.

#### **ARTICLE 51. COMPLETION OF THE WORK**

51.1 The **Commissioner**, after declaring the **Contractor** in default, may then have the **Work** completed by such means and in such manner, by **Contract** with or without public letting, or otherwise, as he/she may deem advisable, utilizing for such purpose such of the **Contractor's** plant, materials, equipment, tools and supplies remaining on the **Site**, and also such **Subcontractors**, as he/she may deem advisable.

51.2 After such completion, the **Commissioner** shall make a certificate stating the expense incurred in such completion, which shall include the cost of re-letting and also the total amount of liquidated damages (at the rate provided for in the **Contract**) from the date when the **Work** should have been completed by the **Contractor** in accordance with the terms hereof to the date of actual completion of the **Work**. Such certificate shall be binding and conclusive upon the **Contractor**, its Sureties, and any person claiming under the **Contractor**, as to the amount thereof.

51.3 The expense of such completion, including any and all related and incidental costs, as so certified by the **Commissioner**, and any liquidated damages assessed against the **Contractor**, shall be charged against and deducted out of monies which are earned by the **Contractor** prior to the date of default. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

#### **ARTICLE 52. PARTIAL DEFAULT**

52.1 In case the **Commissioner** shall declare the **Contractor** in default as to a part of the **Work** only, the **Contractor** shall discontinue such part, shall continue performing the remainder of the **Work** in strict conformity with the terms of this **Contract**, and shall in no way hinder or interfere with any **Other Contractor(s)** or persons whom the **Commissioner** may engage to complete the **Work** as to which the **Contractor** was declared in default.

52.2 The provisions of this Chapter relating to declaring the **Contractor** in default as to the entire **Work** shall be equally applicable to a declaration of partial default, except that the **Commissioner** shall be entitled to utilize for completion of the part of the **Work** as to which the **Contractor** was declared in default only such plant, materials, equipment, tools and supplies as had been previously used by the **Contractor** on such part.

#### **ARTICLE 53. PERFORMANCE OF UNCOMPLETED WORK**

53.1 In completing the whole or any part of the **Work** under the provision of this Chapter X, the **Commissioner** shall have the power to depart from or change or vary the terms and provisions of this **Contract**, provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variation, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the **Commissioner's** certificate of the cost of completion referred to in Article 51, nor shall it constitute a defense to an action to recover the amount by which such certificate exceeds the amount which would have been payable to the **Contractor** hereunder but for its default.

#### **ARTICLE 54. OTHER REMEDIES**

54.1 In addition to the right to declare the **Contractor** in default pursuant to this Chapter X, the **Commissioner** shall have the absolute right, in his/her sole discretion and without a hearing, to complete or cause to complete in the same manner as described in Articles 51 and 53, any or all unsatisfactory or uncompleted punch list **Work** that remains after the completion date specified in the Final Approved Punch List. A written notice of the exercise of this right shall be sent to the **Contractor** who shall immediately quit the **Site** in accordance with the provisions of Article 50.

54.2 The previous provisions of this Chapter X shall be in addition to any and all other legal or equitable remedies permissible in the premises.

54.3 The exercise by the **City** of any remedy set forth herein shall not be deemed a waiver by the **City** of any other legal or equitable remedy contained in this **Contract** or provided under **Law**.

54.4 The expense of such completion, including any and all related and incidental costs, as so certified by the **Commissioner**, shall be charged against and deducted out of monies which have been earned by the **Contractor** prior to the date of the exercise of the right set forth in Article 54.1; the balance of such monies, if any, subject to the other provisions of this **Contract**, to be paid to the **Contractor** without interest after such completion. Should the expense of such completion, as certified by the **Commissioner**, exceed the total sum which would have been payable under the **Contract** if it had been completed by the **Contractor**, any excess shall be paid by the **Contractor**.

## CHAPTER XI MISCELLANEOUS PROVISIONS

### ARTICLE 55. CONTRACTOR'S WARRANTIES

55.1 In consideration of, and to induce, the award of this **Contract** to the **Contractor**, the **Contractor** represents and warrants:

55.1.1 That it is financially solvent, sufficiently experienced and competent to perform the **Work**;  
and

55.1.2 That the facts stated in its bid and the information given by it pursuant to the Information for Bidders is true and correct in all respects; and

55.1.3 That it has read and complied with all requirements set forth in the **Contract**.

### ARTICLE 56. CLAIMS AND ACTIONS THEREON

56.1 Any claim, that is not subject to dispute resolution under the **PPB Rules** or this **Contract**, against the **City** for damages for breach of **Contract** shall not be made or asserted in any lawsuit, unless the **Contractor** shall have strictly complied with all requirements relating to the giving of notice and of information with respect to such claims, as herein before provided.

56.2 Nor shall any lawsuit be instituted or maintained on any such claims unless such lawsuit is commenced within six (6) months after the date the **Commissioner** issues a Certificate of **Substantial Completion** pursuant to Article 44; except that:

56.2.1 Any claims arising out of events occurring after the date the **Commissioner** issues a Certificate of **Substantial Completion** and before **Final Acceptance** of the **Work** shall be asserted within six (6) months of **Final Acceptance** of the **Work**;

56.2.2 Any claims for monies deducted, retained or withheld under the provisions of this **Contract** shall be asserted within six (6) months after the date when such monies becomes due and payable hereunder; and

56.2.3 If the **Commissioner** exercises his/her right to terminate the **Contract** pursuant to Article 64, any such lawsuit shall be commenced within six (6) months of the date the **Commissioner** exercises said right.

## ARTICLE 57. INFRINGEMENT

57.1 The **Contractor** shall be solely responsible for and shall indemnify the **City** against any and all claims and judgments for damages for any infringement of copyright and patents or use of patented articles, tools, materials, equipment, appliances or processes in the performance or completion of the **Work**, including all costs and expenses which the **City** shall or may incur or be obligated to pay by reason thereof.

## ARTICLE 58. NO CLAIM AGAINST OFFICERS, AGENTS OR EMPLOYEES

58.1 No claim whatsoever shall be made by the **Contractor** against any officer, agent or employee of the **City** for, or on account of, anything done or omitted to be done in connection with this **Contract**.

## ARTICLE 59. SERVICES OF NOTICES

59.1 The **Contractor** hereby designates the business address specified in its bid, as the place where all notices, directions or other communications to the **Contractor** may be delivered, or to which they may be mailed. Actual delivery of any such notice, direction or communication to the aforesaid place, or depositing it in a postpaid wrapper addressed thereto in any post office box (P.O. Box) regularly maintained by the United States Postal Service, shall be conclusively deemed to be sufficient service thereof upon the **Contractor** as the date of such delivery or deposit.

59.2 Such address may be changed at any time by an instrument in writing, executed and acknowledged by the **Contractor**, and delivered to the **Commissioner**.

59.3 Nothing herein contained shall, however, be deemed to preclude or render inoperative the service of any notice, direction or other communication upon the **Contractor** personally, or, if the **Contractor** is a corporation, upon any officer thereof.

## ARTICLE 60. UNLAWFUL PROVISIONS DEEMED STRICKEN FROM CONTRACT

60.1 If this **Contract** contains any unlawful provision not an essential part of the **Contract** and which shall not appear to have been a controlling or material inducement to the making thereof, the same shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the **Contract** without affecting the binding force of the remainder.

## ARTICLE 61. ALL LEGAL PROVISIONS DEEMED INCLUDED

61.1 It is the intent and understanding of the parties to this **Contract** that each and every provision of **Law** required to be inserted in this **Contract** shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is to be deemed to be inserted herein, and if, through mistake or otherwise, any such provision is not inserted, or is not inserted in correct form, then this **Contract** shall forthwith upon the application of either party be amended by such insertion so as to comply strictly with the **Law** and without prejudice to the rights of either party hereunder.

## ARTICLE 62. TAX EXEMPTION

62.1 The **City** is exempt from payment of Federal, State, local taxes and Sales and Compensation Use Taxes of the State of New York and of cities and counties on all materials and supplies sold to the **City** pursuant to

the provisions of this **Contract**. These taxes are not to be included in bids. However, this exemption does not apply to tools, machinery, equipment or other property leased by or to the **Contractor** or a **Subcontractor**, or to supplies and materials which even though they are consumed, are not incorporated into the completed **Work** (consumable supplies), and the **Contractor** and its **Subcontractors** shall be responsible for and pay any and all applicable taxes, including Sales and Compensation Use Taxes, on such leased tools, machinery, equipment or other property and upon all such unincorporated supplies and materials.

62.2 The **Contractor** agrees to sell and the **City** agrees to purchase all supplies and materials, other than consumable supplies, required, necessary or proper for or incidental to the construction of the **Project** covered by this **Contract**. The sum paid under this **Contract** for such supplies and materials shall be in full payment and consideration for the sale of such supplies and materials herein.

62.2.1 The **Contractor** agrees to construct the **Project** and to perform all **Work**, labor and services rendered, necessary, proper or incidental thereto for the sum shown in the bid for the performance of such **Work**, labor and services, and the sum so paid pursuant to this **Contract** for such **Work**, labor, etc., shall be in full consideration for the performance by the **Contractor** of all its duties and obligations under this **Contract** in connection with said **Work** and labor.

62.3 The purchase by the **Contractor** of the supplies and materials sold hereunder shall be a purchase or procurement for resale and therefore not subject to the New York State or **City** Sales or Compensation Use Taxes or any such taxes of cities or counties. The sale of such supplies and materials by the **Contractor** to the **City** is exempt from the aforesaid sales or compensating use taxes. With respect to such supplies and materials, the **Contractor**, at the request of the **City**, shall furnish to the **City** such Bills of Sale and other instruments as may be required by the **City**, properly executed, acknowledged and delivered assuring to the **City** title to such supplies and materials, free of liens and/or encumbrances, and the **Contractor** shall mark or otherwise identify all such materials as the property of the **City**.

62.4 Title to all materials to be sold by the **Contractor** to the **City** pursuant to the provisions of the **Contract** shall immediately vest in and become the sole property of the **City** upon delivery of such supplies and materials to the **Site** and prior to its becoming a part of the permanent structure and/or construction. Notwithstanding such transfer of title, the **Contractor** shall have the full and continuing responsibility to install such materials and supplies in accordance with the provisions of this **Contract**, protect them, maintain them in a proper condition and forthwith repair, replace and make good any damage thereto, theft or disappearance thereof, and furnish additional materials in place of any that may be lost, stolen or rendered unusable, without cost to the **City**, until such time as the **Work** covered by the **Contract** is fully accepted by the **City**. Such transfer of title shall in no way affect any of the **Contractor's** obligations hereunder. In the event that, after title has passed to the **City**, any of such supplies and materials are rejected as being defective or otherwise unsatisfactory, title to all such supplies and materials shall be deemed to have been transferred back to the **Contractor**.

62.5 The purchase by **Subcontractors** of supplies and materials to be sold hereunder shall also be a purchase or procurement for resale to the **Contractor** (either directly or through other **Subcontractors**) and therefore not subject to the aforesaid Sales or Compensation Use Taxes, provided that the subcontract agreements provide for the resale of such supplies and materials prior to and separate and apart from the incorporation of such supplies and materials into the permanent structure and/or construction and that such subcontract agreements are in a form similar to this **Contract** with respect to the separation of the sale of materials from the **Work** and labor, services, consumable supplies and any other matters to be provided, and provided further that the subcontract agreements provide separate prices for materials and all other services and matters. Such separation shall actually be followed in practice, including the separation of payments for supplies and materials from the payments for other **Work** and labor and other things to be provided.

62.6 The **Contractor** and its **Subcontractors** and Materialmen shall obtain any and all necessary **Contractor Exempt Purchase Certificates** or **Resale Certificates** from the appropriate governmental **Agency** or

**Agencies**, and furnish a **Contractor Exempt Purchase Certificate** or **Resale Certificate** to all persons, firms or corporations from which they purchase supplies and materials for the performance of the **Work** covered by this **Contract**.

62.7 In the event any of the provisions of this article shall be deemed to be in conflict with any other provisions of this **Contract** or create any ambiguity, then the provisions of this article shall control.

### ARTICLE 63. INVESTIGATION(S) CLAUSE

63.1 The parties to this **Contract** agree to cooperate fully and faithfully with any investigation, audit or inquiry conducted by a United States, a State of New York (State) or a **City** governmental **Agency** or authority that is empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath, or conducted by the Inspector General of a governmental **Agency** that is a party in interest to the transaction, submitted bid, submitted proposal, **Contract**, lease, permit or license that is the subject of the investigation, audit or inquiry.

63.2 If any person who has been advised that his/her statement, and any information from such statement, will not be used against him/her in any subsequent criminal proceeding refuses to testify before a grand jury or other governmental **Agency** or authority empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath concerning the award of or performance under any transaction, agreement, lease, permit, **Contract**, or license entered into with the **City**, the State, or any political subdivision or public authority thereof, or the Port Authority of New York and New Jersey, or any local development corporation within the **City**, or any public benefit corporation organized under the **Laws** of the State of New York, or;

63.3 If any person refuses to testify for a reason other than the assertion of his/her privilege against self incrimination in an investigation, audit or inquiry conducted by a **City** or State governmental **Agency** or authority empowered directly or by designation to compel the attendance of witnesses and to take testimony under oath, or by the Inspector General of the governmental **Agency** that is a party in interest in, and is seeking testimony concerning the award of, or performance under any transaction, agreement, lease, permit, **Contract**, or license entered into with the **City**, the State, or any political subdivision thereof or any local development corporation within the **City**, then;

63.4 The **Commissioner** whose **Agency** is a party in interest to the transaction, submitted bid, submitted proposal, **Contract**, lease, permit, or license shall convene a hearing, upon not less than five (5) days written notice to the parties involved to determine if any penalties should attach for the failure of a person to testify.

63.5 If any non-governmental party to the hearing requests an adjournment, the **Commissioner** who convened the hearing may, upon granting the adjournment, suspend any **Contract**, lease, permit, or license, pending the final determination pursuant to Article 63.7 without the **City** incurring any penalty or damages for delay or otherwise.

63.6 The penalties which may attach after a final determination by the **Commissioner** may include but shall not exceed:

63.6.1 The disqualification for a period not to exceed five (5) years from the date of an adverse determination for any person, or any entity of which such person was a member at the time the testimony was sought, from submitting bids for, or transacting business with, or entering into or obtaining any **Contract**, lease, permit or license with or from the **City**; and/or

63.6.2 The cancellation or termination of any and all such existing **City Contracts**, leases, permits or licenses that the refusal to testify concerns and that have not been assigned as permitted under this **Agreement**, nor the proceeds of which pledged, to an unaffiliated and unrelated institutional lender for fair value prior to the issuance of the notice scheduling the hearing, without the **City** incurring any penalty or damages on account of such cancellation or termination; monies lawfully due for goods delivered, **Work** done, rentals, or fees accrued prior to the cancellation or termination shall be paid by the **City**.

63.7 The **Commissioner** shall consider and address in reaching his/her determination and in assessing an appropriate penalty the factors in Articles 63.7.1 and 63.7.2. The **Commissioner** may also consider, if relevant and appropriate, the criteria established in Articles 63.7.3 and 63.7.4, in addition to any other information which may be relevant and appropriate:

63.7.1 The party's good faith endeavors or lack thereof to cooperate fully and faithfully with any governmental investigation or audit, including but not limited to the discipline, discharge, or disassociation of any person failing to testify, the production of accurate and complete books and records, and the forthcoming testimony of all other members, agents, assignees or fiduciaries whose testimony is sought.

63.7.2 The relationship of the person who refused to testify to any entity that is a party to the hearing, including but not limited to, whether the person whose testimony is sought has an ownership interest in the entity and/or the degree of authority and responsibility the person has within the entity.

63.7.3 The nexus of the testimony sought to the subject entity and its **Contracts**, leases, permits or licenses with the **City**.

63.7.4 The effect a penalty may have on an unaffiliated and unrelated party or entity that has a significant interest in an entity subject to penalties under Article 63.6, provided that the party or entity has given actual notice to the **Commissioner** upon the acquisition of the interest, or at the hearing called for in Article 63.4, gives notice and proves that such interest was previously acquired. Under either circumstance the party or entity shall present evidence at the hearing demonstrating the potential adverse impact a penalty will have on such person or entity.

#### 63.8 Definitions:

63.8.1 The term "license" or "permit" as used herein shall be defined as a license, permit, franchise or concession not granted as a matter of right.

63.8.2 The term "person" as used herein shall be defined as any natural person doing business alone or associated with another person or entity as a partner, director, officer, principal or employee.

63.8.3 The term "entity" as used herein shall be defined as any firm, partnership, corporation, association, joint venture, or person that receives monies, benefits, licenses, leases, or permits from or through the **City** or otherwise transacts business with the **City**.

63.8.4 The term "member" as used herein shall be defined as any person associated with another person or entity as a partner, director, officer, principal or employee.

63.9 In addition to and notwithstanding any other provision of this **Contract**, the **Commissioner** may in his/her sole discretion terminate this **Contract** upon not less than three (3) **Days** written notice in the event the

**Contractor** fails to promptly report in writing to the **Commissioner** of the Department of Investigations ("DOI") of the **City** any solicitation of money, goods, requests for future employment or other benefit or thing of value, by or on behalf of any employee of the **City** or other person, firm, corporation or entity for any purpose which may be related to the procurement or obtaining of this **Contract** by the **Contractor**, or affecting the performance of this **Contract**.

#### ARTICLE 64. TERMINATION BY THE CITY

64.1 In addition to termination pursuant to any other article of this **Contract**, the **Commissioner** may, at any time, terminate this **Contract** by written notice to the **Contractor**. In the event of termination, the **Contractor** shall, upon receipt of such notice, unless otherwise directed by the **Commissioner**:

64.1.1 Stop **Work** on the date specified in the notice;

64.1.2 Take such action as may be necessary for the protection and preservation of the **City's** materials and property;

64.1.3 Cancel all cancelable orders for material and equipment;

64.1.4 Assign to the **City** and deliver to the **Site** or another location designated by the **Commissioner**, any non-cancelable orders for material and equipment that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract** and not incorporated in the **Work**;

64.1.5 Take no action which will increase the amounts payable by the **City** under this **Contract**.

64.2 In the event of termination by the **City** pursuant to this article, payment to the **Contractor** shall be in accordance with Articles 64.2.1, 64.2.2 or 64.2.3, to the extent that each respective article applies.

64.2.1 Lump Sum Contracts or Items: On all lump sum **Contracts**, or on lump sum items in a **Contract**, the **City** will pay the **Contractor** the sum of Articles 64.2.1(a) and 64.2.1(b), less all payments previously made pursuant to this **Contract**. On lump sum **Contracts** only, the **City** will also pay the **Contractor** an additional sum as provided in 64.2.1(c).

64.2.1(a) For **Work** completed prior to the notice of termination, the **Contractor** shall be paid a pro rata portion of the lump sum bid amount, plus approved change orders, based upon the percent completion of the **Work**, as determined by the **Commissioner**. For the purpose of determining the pro rata portion of the lump sum bid amount to which the **Contractor** is entitled, the Bid Breakdown submitted in accordance with Article 41 shall be considered, but shall not be dispositive. The **Commissioner's** determination hereunder shall be final, binding and conclusive.

64.2.1(b) For non-cancelable material and equipment, less salvage value, that is not capable of use except in the performance of this **Contract** and has been specifically fabricated for the sole purpose of this **Contract**, but not yet incorporated in the **Work**, the **Contractor** shall be paid the lesser of:

64.2.1(b)(i) The direct cost, as defined in Article 64.2.4; or

64.2.1(b)(ii) The fair and reasonable value, whichever is less, of such material and equipment, plus necessary and reasonable delivery costs.

64.2.1(b)(iii) In addition, the **Contractor** shall be paid five (5%) percent of Article 64.2.1(b)(i) or Article 64.2.1(b)(ii), whichever applies.

64.2.1(c) Except as otherwise provided in Article 64.2.1(d), on all lump sum **Contracts**, the **Contractor** shall be paid the percentage indicated below applied to the difference between the total lump sum bid amount and the total of all payments made prior to the notice of termination plus all payments allowed pursuant to Articles 64.2.1(a) and 64.2.1(b):

64.2.1(c)(i) Five (5%) percent of the first five million (\$5,000,000.) dollars; and

64.2.1(c)(ii) Three (3%) percent of any amount between five million (\$5,000,000.) dollars and fifteen million (\$15,000,000.) dollars; plus

64.2.1(c)(iii) One (1%) percent of any amount over fifteen million (\$15,000,000.) dollars.

64.2.1(d) In the event the City terminates a lump sum **Contract** pursuant to this article within ninety (90) days after registration of the **Contract** with the **Comptroller**, the **Contractor** shall be paid one (1%) percent of the difference between the lump sum bid amount and the total of all payments made pursuant to this article.

64.2.2 Unit Price Contracts or Items: On all unit price **Contracts**, or on unit price items in a **Contract**, the City will pay the **Contractor** the sum of Articles 64.2.2(a) and 64.2.2(b), less all payments previously made pursuant to this **Contract**:

64.2.2(a) For all completed units, the unit price stated in the **Contract**, and

64.2.2(b) For units that have been ordered but are only partially completed, the **Contractor** will be paid:

64.2.2(b)(i) A pro rata portion of the unit price stated in the **Contract** based upon the percent completion of the unit and

64.2.2(b)(ii) For non-cancelable material and equipment, payment will be made pursuant to Article 64.2.1(b).

64.2.3 Time and Material Contracts or Items: On all **Contracts** or items in a **Contract** where time and material records are specified as the basis for payment of the **Work**, the **Contractor** shall be paid in accordance with Article 26, less all payments previously made pursuant to this **Contract**.

64.2.4 Direct Costs: Direct Costs as used in this article shall mean:

64.2.4(a) The actual purchase price of material and equipment, plus necessary and reasonable delivery costs,

64.2.4(b) The actual cost of labor involved in construction and installation at the **Site**, and

64.2.4(c) The actual cost of necessary bonds and insurance purchased pursuant to requirements of this **Contract** less any amounts that have been or should be refunded by the **Contractor's** sureties or insurance carriers.

64.2.4(d) Direct Cost shall not include overhead.

64.3 In no event shall any payments under this article exceed the **Contract** price for such items.

64.4 All payments pursuant to this article shall be in the nature of liquidated damages and shall be accepted by the **Contractor** in full satisfaction of all claims against the **City**.

64.5 The **City** may deduct or set off against any sums due and payable pursuant to this article, any deductions authorized by this **Contract** or by **Law** (including but not limited to liquidated damages) and any claims it may have against the **Contractor**. The **City's** exercise of the right to terminate the **Contract** pursuant to this article shall not impair or otherwise effect the **City's** right to assert any claims it may have against the **Contractor** in a plenary action.

64.6 Where the **Work** covered by the **Contract** has been substantially completed, as determined in writing by the **Commissioner**, termination of the **Work** shall be handled as an omission of **Work** pursuant to Articles 29 and 33, in which case a Change Order will be issued to reflect an appropriate reduction in the **Contract** Sum, or if the amount is determined after final payment, such amount shall be paid by the **Contractor**.

#### **ARTICLE 65. CHOICE OF LAW, CONSENT TO JURISDICTION AND VENUE**

65.1 This **Contract** shall be deemed to be executed in the **City** of New York, State of New York, regardless of the domicile of the **Contractor**, and shall be governed by and construed in accordance with the **Laws** of the State of New York and the **Laws** of the United States, where applicable.

65.2 The parties agree that any and all claims asserted against the **City** arising under this **Contract** or related thereto shall be heard and determined in the courts of the State of New York ("New York State Courts") located in the **City** and County of New York. To effect this **Contract** and intent, the **Contractor** agrees:

65.2.1 If the **City** initiates any action against the **Contractor** in Federal Court or in New York State Court, service of process may be made on the **Contractor** either in person, wherever such **Contractor** may be found, or by registered mail addressed to the **Contractor** at its address as set forth in this **Contract**, or to such other address as the **Contractor** may provide to the **City** in writing; and

65.2.2 With respect to any action between the **City** and the **Contractor** in New York State Court, the **Contractor** hereby expressly waives and relinquishes any rights it might otherwise have:

65.2.2(a) To move to dismiss on grounds of forum non conveniens;

65.2.2(b) To remove to Federal Court; and

65.2.2(c) To move for a change of venue to a New York State Court outside New York County.

65.2.3 With respect to any action brought by the **City** against the **Contractor** in Federal Court located in the **City**, the **Contractor** expressly waives and relinquishes any right it might otherwise have to move to transfer the action to a United States Court outside the **City**.

65.2.4 If the **Contractor** commences any action against the **City** in a Court located other than in the **City** and State of New York, upon request of the **City**, the **Contractor** shall either consent to a transfer of the action to a State Court of competent jurisdiction located in the **City** and State of New York or, if the Court where the action is initially brought will not or cannot transfer the action, the

**Contractor** shall consent to dismiss such action without prejudice and may thereafter reinstate the action in a State Court of competent jurisdiction in the **City**.

65.3 If any provision(s) of this article is held unenforceable for any reason, each and all other provision(s) shall nevertheless remain in full force and effect.

#### **ARTICLE 66. PARTICIPATION IN AN INTERNATIONAL BOYCOTT**

66.1 The **Contractor** agrees that neither the **Contractor** nor any substantially owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations of the United States Department of Commerce promulgated thereunder.

66.2 Upon the final determination by the Commerce Department or any other **Agency** of the United States as to, or conviction of the **Contractor** or a substantially-owned affiliated company thereof, participation in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations promulgated thereunder, the **Comptroller** may, at his/her option, render forfeit and void this **Contract**.

66.3 The **Contractor** shall comply in all respects, with the provisions of Section 6-114 of the Administrative Code and the rules and regulations issued by the **Comptroller** thereunder.

#### **ARTICLE 67. LOCALLY BASED ENTERPRISE PROGRAM**

67.1 This **Contract** is subject to the requirements of Section 6-108.1 of the Administrative Code and regulations promulgated thereunder. No construction **Contract** shall be awarded unless and until these requirements have been complied with in their entirety.

67.2 Unless specifically waived by the **Commissioner** with the approval of the Division of Economic and Financial Opportunity of the Department of Business Services, if any portion of the **Contract** is subcontracted, not less than ten (10%) percent of the total dollar amount of the **Contract** shall be awarded to locally based enterprise ("LBEs"); except that where less than ten (10%) percent of the total dollar amount of the **Contract** is subcontracted, such lesser percentage shall be so awarded.

67.3 The prime **Contractor** shall not require performance and payment bonds from LBE **Subcontractors**.

67.4 If the **Contractor** has indicated prior to award that no **Work** will be subcontracted, no **Work** shall be subcontracted without the prior approval of the **Commissioner**, which shall be granted only if the **Contractor** makes a good faith effort beginning at least six (6) weeks before the **Work** is to be performed to obtain LBE **Subcontractors** to perform the **Work**.

67.5 If the **Contractor** has not identified sufficient LBE **Subcontractors** prior to award, it shall sign a letter of compliance stating that it complies with Section 6-108.1 of the Administrative Code, recognizes that achieving the LBE requirement is a condition of its **Contract**, and shall submit documentation demonstrating its good faith efforts to obtain LBEs. After award, the **Contractor** shall begin to solicit LBE's to perform subcontracted **Work** at least six (6) weeks before the date such **Work** is to be performed and shall demonstrate that a good faith effort has been made to obtain LBE's on each subcontract until it meets the required percentage.

67.6 Failure of the **Contractor** to comply with the requirements of Section 6-108.1 of the Administrative Code and the regulations promulgated thereunder shall constitute a material breach of **Contract**. Remedy for such breach of **Contract** may include the imposition of any or all of the following sanctions:

67.6.1 Reducing a **Contractor's** compensation by an amount equal to the dollar value of the percentage of the LBE subcontracting requirement not complied with;

67.6.2 Declaring the **Contractor** in default;

67.6.3 Where non-compliance is by an LBE, de-certifying and declaring the LBE ineligible to participate in the LBE program for a period of up to three (3) years.

#### ARTICLE 68. ANTITRUST

68.1 The **Contractor** hereby assigns, sells and transfers to the **City** all right, title and interest in and to any claims and causes of action arising under the antitrust **Laws** of New York State or of the United States relating to the particular goods or services purchased or procured by the **City** under this **Contract**.

#### ARTICLE 69. MacBRIDE PRINCIPLES PROVISIONS

69.1 Notice To All Prospective **Contractors**:

69.1.1 Local Law No. 34 of 1991 became effective on September 10, 1991 and added Section 6-115.1 of the Administrative Code. The local **Law** provides for certain restrictions on **City Contracts** to express the opposition of the people of the **City** to employment discrimination practices in Northern Ireland to promote freedom of work-place opportunity.

69.1.2 Pursuant to Section 6-115.1, prospective **Contractors** for **Contracts** to provide goods or services involving an expenditure of an amount greater than ten thousand (\$10,000.) dollars, or for construction involving an amount greater than fifteen thousand (\$15,000.) dollars, are asked to sign a rider in which they covenant and represent, as a material condition of their **Contract**, that any business operations in Northern Ireland conducted by the **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** will be conducted in accordance with the MacBride Principles of nondiscrimination in employment.

69.1.3 Prospective **Contractors** are not required to agree to these conditions. However, in the case of **Contracts** let by competitive sealed bidding, whenever the lowest responsible bidder has not agreed to stipulate to the conditions set forth in this notice and another bidder who has agreed to stipulate to such conditions has submitted a bid within five (5%) percent of the lowest responsible bid for a **Contract** to supply goods, services or contraction of comparable quality, the **Agency** shall refer such bids to the Mayor, the Speaker or other officials, as appropriate, who may determine, in accordance with applicable **Law** and rules, that it is in the best interest of the **City** that the **Contract** be awarded to other than the lowest responsible pursuant to Section 313(b)(2) of the **City Charter**.

69.1.4 In the case of **Contracts** let by other than competitive sealed bidding, if a prospective **Contractor** does not agree to these conditions, no **Agency**, elected official or the **City Council** shall award the **Contract** to that bidder unless the **Agency** seeking to use the goods, services or construction certifies in writing that the **Contract** is necessary for the **Agency** to perform its functions and there is no other responsible **Contractor** who will supply goods, services or construction of comparable quality at a comparable price.

69.2 In accordance with Section 6-115.1 of the Administrative Code, the **Contractor** stipulates that such **Contractor** and any individual or legal entity in which the **Contractor** holds a ten (10%) percent or greater ownership interest in the **Contractor** either:

69.2.1 Have no business operations in Northern Ireland, or

69.2.2 Shall take lawful steps in good faith to conduct any business operations they have in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles.

69.3 For purposes of this Article, the following terms shall have the following meanings:

69.3.1 "MacBride Principles" shall mean those principles relating to nondiscrimination in employment and freedom of work-place opportunity which require employers doing business in Northern Ireland to:

69.3.1(a) increase the representation of individuals from under-represented religious groups in the workforce, including managerial, supervisory, administrative, clerical and technical jobs;

69.3.1(b) take steps to promote adequate security for the protection of employees from under-represented religious groups both at the work-place and while traveling to and from **Work**;

69.3.1(c) ban provocative religious or political emblems from the workplace;

69.3.1(d) publicly advertise all job openings and make special recruitment efforts to attract applicants from under-represented religious groups;

69.3.1(e) establish layoff, recall and termination procedures which do not in practice favor a particular religious group;

69.3.1(f) abolish all job reservations, apprenticeship restrictions and different employment criteria which discriminate on the basis of religion;

69.3.1(g) develop training programs that will prepare substantial numbers of current employees from under-represented religious groups for skilled jobs, including the expansion of existing programs and the creation of new programs to train, upgrade and improve the skills of workers from under-represented religious groups;

69.3.1(h) establish procedures to assess, identify and actively recruit employees from under-represented religious groups with potential for further advancement; and

69.3.1(i) appoint a senior management staff member to oversee affirmative action efforts and develop a timetable to ensure their full implementation.

69.4 The **Contractor** agrees that the covenants and representations in Article 69.2 are material conditions to this **Contract**. In the event the **Agency** receives information that the **Contractor** who made the stipulation required by this Article is in violation thereof, the **Agency** shall review such information and give the **Contractor** an opportunity to respond. If the **Agency** finds that a violation has occurred, the **Agency** shall have the right to declare the **Contractor** in default in default and/or terminate this **Contract** for cause and procure supplies, services or **Work** from another source in the manner the **Agency** deems proper. In the event of such termination, the

**Contractor** shall pay to the **Agency**, or the **Agency** in its sole discretion may withhold from any amounts otherwise payable to the **Contractor**, the difference between the **Contract** price for the uncompleted portion of this **Contract** and the cost to the **Agency** of completing performance of this **Contract** either itself or by engaging another **Contractor** or **Contractors**. In the case of a requirement **Contract**, the **Contractor** shall be liable for such difference in price for the entire amount of supplies required by the **Agency** for the uncompleted term of **Contractor's Contract**. In the case of a construction **Contract**, the **Agency** shall also have the right to hold the **Contractor** in partial or total default in accordance with the default provisions of this **Contract**, and/or may seek debarment or suspension of the **Contractor**. The rights and remedies of the **Agency** hereunder shall be in addition to, and not in lieu of, any rights and remedies the **Agency** has pursuant to this **Contract** or by operation of **Law**.

#### ARTICLE 70. HEALTH INSURANCE COVERAGE

70.1 If the price for which this **Contract** was awarded exceeds \$100,000, or if the price for which this **Contract** was awarded when combined with other construction or services contracts awarded the **Contractor** by the **City** in the year prior to award of this **Contract** exceeds \$100,000, the **Contractor**, following registration of the **Contract**, shall be required to submit responses to requests for information regarding the nature of any health insurance provided by the **Contractor** to its employees and their spouses and domestic partners, upon request of the **Agency** or other designated **City** agency.

#### ARTICLE 71. PROHIBITION OF TROPICAL HARDWOODS

71.1 Tropical hardwoods, as defined in Section 165 of the New York State Finance Law ("Finance Law"), shall not be utilized in the performance of this **Contract** except as expressly permitted by Section 165 of the Finance Law.

#### ARTICLE 72. CONFLICTS OF INTEREST

72.1 Section 2604 of the **City** Charter and other related provisions of the **City** Charter, the Administrative Code and the Penal Law are applicable under the terms of this **Contract** in relation to Conflicts of Interest and shall be extended to **Subcontractors** authorized to perform **Work**, labor and services pursuant to this **Contract** and further, it shall be the duty and responsibility of the **Contractor** to so inform its respective **Subcontractors**. Notice is hereby given that, under certain circumstances, penalties may be invoked against the donor as well as the recipient of any form of valuable gift.

#### ARTICLE 73. MERGER CLAUSE

73.1 The Written **Contract** herein, contains all the terms and conditions agreed upon by the parties hereto, and no other agreement, oral or otherwise, regarding the subject matter of this **Contract** shall be deemed to exist or to bind any of the parties hereto, or to vary any of the terms contained herein.

#### ARTICLE 74. STATEMENT OF WORK

74.1 The **Contractor** shall furnish all labor and materials and perform all **Work** in strict accordance with the **Specifications** and **Addenda** thereto, numbered 3.

**ARTICLE 75. COMPENSATION TO BE PAID TO CONTRACTOR**

75.1 The City will pay and the Contractor will accept in full consideration for the performance of the Contract, subject to additions and deductions as provided herein, the total sum of: Five million six hundred fifty five thousand three hundred twenty dollars Dollars, (\$5,655,320.00), this said sum being the Amount at which the Contract was awarded to the Contractor at a public letting thereof, based upon the Contractor's bid for the Contract.

**ARTICLE 76. ELECTRONIC FUNDS TRANSFER**

76.1 In accordance with Section 6-107.1 of the New York City Administrative Code, the Contractor agrees to accept payments under this Agreement from the City by electronic funds transfer. An electronic funds transfer is any transfer of funds, other than a transaction originated by check, draft or similar paper instrument, which is initiated through an electronic terminal, telephonic instrument or computer or magnetic tape so as to order, instruct or authorize a financial institution to debit or credit an account. Prior to the first payment made under this Agreement, Contractor shall designate one financial institution or other authorized payment agent and shall complete the attached "EFT Vendor Payment Enrollment Form" in order to provide the Commissioner of Finance with information necessary for Contractor to receive electronic funds transfer payments through the designated financial institution or authorized payment agent. The crediting of the amount of a payment to the appropriate account on the books of a financial institution or other authorized payment agent designated by the Contractor shall constitute full satisfaction by the City for the amount of the payment under this agreement. The account information supplied by the Contractor to facilitate the electronic funds transfer shall remain confidential to the fullest extent provided by law.

76.2 The agency head may waive the application of the requirements herein to payments on contracts entered into pursuant to §315 of the City Charter. In addition, the Commissioner of the Department of Finance and the Comptroller may jointly issue standards pursuant to which the contracting agency may waive the requirements hereunder for payments in the following circumstances: (i) for individuals or classes of individuals for whom compliance imposes a hardship; (ii) for classifications or types of checks; or (iii) in other circumstances as may be necessary in the interest of the City.

**ARTICLE 77 - PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS ENTERPRISES IN CITY PROCUREMENT**

**NOTICE TO ALL PROSPECTIVE CONTRACTORS**

**ARTICLE I. M/WBE PROGRAM**

Local Law No. 129 of 2005 added Section 6-129 to the Administrative Code of the City of New York. The local law creates a program for participation by minority-owned and women-owned business enterprises (MBEs and WBEs) in City procurement. As stated in the Section 6-129, the intent of the program is to address the impact of discrimination on the City's procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are made pursuant to Local Law 129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

If this Contract is subject to the Minority-Owned and Women-Owned Business Enterprise ("M/WBE") program created by Local Law 129, the specific requirements of M/WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "Subcontractor Utilization Plan"), and are detailed below. The Contractor must comply with all applicable M/WBE requirements for this Contract. Schedule B of the Contract ("Subcontractor Utilization Plan") is included in the Bid Booklet.

Article I, Part A, below, sets forth provisions related to the participation goals for construction and professional services contracts. Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE program.

**PART A: PARTICIPATION GOALS FOR CONSTRUCTION AND PROFESSIONAL SERVICES CONTRACTS**

1. The Target Subcontracting Percentage applicable to this Contract is set forth on Schedule B, Part I to this Contract (see Page 1, line (1)). The "Target Subcontracting Percentage" is the percentage of the total Contract which Agency anticipates that the prime contractor for this Contract would in the normal course of business award to one or more subcontractors for amounts under \$1 million for construction and professional services.

A prospective contractor may seek a full or partial pre-award waiver of the Target Subcontracting Percentage in accordance with Local Law 129 and Part A, Section 10 below. To apply for the a full or partial waiver of the Target Subcontracting Percentage, a prospective contractor must complete Part III (Page 4) of Schedule B, and must submit such request no later than seven (7) days prior to the date and time the bids or proposals are due, in writing to the Agency by e-mail at [poped@ddc.nyc.gov](mailto:poped@ddc.nyc.gov) or via facsimile at (718) 391-1885. Bidders/proposers who have submitted requests will receive a response by no later than two (2) calendar days prior to the date bids or proposals are due, provided, however, that if that date would fall on a weekend or holiday, a response will be provided by close-of-business on the business day before such weekend or holiday date.

2. The Subcontractor Participation Goals established for this Contract are set forth on Schedule B, Part I to this Contract (see Page 1, line (2) and/or line (3)). The Subcontractor Participation Goals represent a percentage of the total dollar value of all construction and/or professional services subcontracts under this Agreement for amounts under \$1 million.

3. If Subcontractor Participation Goals have been established for this Contract, Contractor agrees or shall agree as a material term of the Agreement that, with respect to the total amount of the Agreement to be awarded to one or more subcontractors pursuant to subcontracts for amounts under \$1 million, Contractor shall be subject to the Subcontractor Participation Goals, unless the goals are modified by Agency in accordance with Local Law 129 and Part A, Section 11 below.

4. If Subcontractor Participation Goals have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, Part II Subcontractor Utilization Plan (see Page 2-3) indicating: (a) the percentage of work it intends to subcontract; (b) the percentage of work it intends to

award to subcontractors for amounts under \$1 million; (c) in cases where the prospective contractor intends to award subcontracts for amounts under \$1 million, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs; and (d) the general time frames in which such work by MBEs and/or WBEs is scheduled to occur. In the event that this Subcontractor Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to award the **Target Subcontracting Percentage**, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre-award waiver of the **Target Subcontracting Percentage** in accordance with Local Law 129 and Part A, Section 10 below.

**THE BIDDER/PROPOSER MUST COMPLETE THE SUBCONTRACTOR UTILIZATION PLAN INCLUDED HEREIN (SCHEDULE B, PART II). SUBCONTRACTOR UTILIZATION PLANS WHICH DO NOT INCLUDE THE REQUIRED AFFIRMATIONS WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE TARGET SUBCONTRACTING PERCENTAGE IS GRANTED (SCHEDULE B PART III). IN THE EVENT THAT THE CITY DETERMINES THAT VENDOR HAS SUBMITTED A SUBCONTRACTOR UTILIZATION PLAN WHERE THE REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE PLAN ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE AFFIRMATION, THE VENDOR WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED PLAN TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS EMAILED OR FAXED (IF THE VENDOR HAS PROVIDED AN EMAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.**

5. Where a Subcontractor Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multi-year contracts, such list shall also be submitted every year thereafter. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Subcontractor Participation Goals established for this Contract by proposing one or more subcontractors that are M/WBEs for any portion of the Wicks trade work if the amount to be awarded to such M/WBE subcontractor is under \$1 million. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.**

6. M/WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the M/WBE participation goals. Such certification must occur prior to the firms' commencement of work as subcontractors. A list of M/WBE firms may be obtained from the DSBS website at [www.nyc.gov/buycertified](http://www.nyc.gov/buycertified), by emailing DSBS at [buyer@sbs.nyc.gov](mailto:buyer@sbs.nyc.gov), by calling (212) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7<sup>th</sup> floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting [www.nyc.gov/getcertified](http://www.nyc.gov/getcertified), emailing [MWBE@sbs.nyc.gov](mailto:MWBE@sbs.nyc.gov), or calling the DSBS certification helpline at (212) 513-6311.

7. Where a Subcontractor Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to, the total amount paid to subcontractors (including subcontractors that are not MBEs or WBEs); the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor pursuant to such plan as well as the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment, the total amount paid to subcontractors (including subcontractors that are not MBEs or WBEs); and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE hired pursuant to such plan, the work performed by, and the dates and amounts paid to each.

8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's Subcontractor Utilization Plan, Agency shall take appropriate action, in accordance with Local Law 129 and Article II below, unless the Contractor has obtained a modification of its Subcontractor Utilization Plan in accordance with Local Law 129 and Part A, Section 11 below.

9. Where a Subcontractor Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds 10 percent of the Agreement, Agency shall establish participation goals for the work to be performed pursuant to the change order.

10. Pre-award waiver of **Target Subcontracting Percentage**. Agency may grant a full or partial waiver of the **Target Subcontracting Percentage** to a bidder or proposer, as applicable, who demonstrates—before submission of the bid or proposal—that it has legitimate business reasons for proposing the level of subcontracting in its Subcontractor Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder or proposer, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts for under one million dollars represented by the **Target Subcontracting Percentage**. In making such determination, Agency may consider whether the Subcontractor Utilization Plan is consistent with past subcontracting practices of the bidder or proposer, as applicable, and whether the bidder or proposer, as applicable, has made good faith efforts to identify portions of the Contract that it intends to subcontract.

11. Modification of Subcontractor Utilization Plan. A Contractor may request a modification of its Subcontractor Utilization Plan (**Subcontractor Participation Goals**) after award of this Contract. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its Subcontractor Utilization Plan as part of its bid submission.** The Agency may grant a request for Modification of a Contractor's Subcontractor Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the **Subcontractor Participation Goals**. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

- (a) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;
- (b) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;
- (c) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs and WBEs that their interest in the Contract was solicited;
- (d) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the Subcontractor Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;
- (e) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;
- (f) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts;
- (g) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;
- (h) Description of how recommendations made by DSBS and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

Agency's M/WBE officer shall provide written notice to the Contractor of the determination.

12. If this Contract is for an indefinite quantity of construction or professional services or is a requirements type contract and the Contractor has submitted a Subcontractor Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Subcontractor Participation Goals**, the Contractor will not be deemed in violation of the M/WBE requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.

13. If **Subcontractor Participation Goals** have been established for this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

## PART B: MISCELLANEOUS

1. The Contractor shall take notice that, if this solicitation requires the establishment of a Subcontractor Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See 6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the Subcontractor Utilization Plan.
2. Pursuant to DSBS rules, construction contracts that include a requirement for a Subcontractor Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Administrative Code Section 6-108.1.
3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and WBEs in contracts.
4. Prospective contractors are encouraged to enter into joint ventures with MBEs and WBEs.
5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE requirements set forth herein and the pertinent provisions of Local Law 129 of 2005, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE requirements of this Contract and pertinent provisions of Local Law 129 of 2005, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of M/WBE's to meet the required **Subcontractor Participation Goals**.

## ARTICLE II. ENFORCEMENT

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.
2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any Subcontractor Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.
3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements this Section 6-129, including, but not limited to any Subcontractor Utilization Plan, Agency may determine that one of the following actions should be taken:
  - (a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;
  - (b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;
  - (c) making a finding that the Contractor is in default of the Contract;
  - (d) terminating the Contract;
  - (e) declaring the Contractor to be in breach of Contract;
  - (f) withholding payment or reimbursement;
  - (g) determining not to renew the Contract;
  - (h) assessing actual and consequential damages;
  - (i) assess liquidated damages or reduction of fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the program established by Section 6-129, or in

meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;

- (j) exercise rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or
- (k) take any other appropriate remedy.

4. If a Subcontractor Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to award subcontracts to MBEs and/or WBEs sufficient to meet the Subcontractor Participation Goals contained in its Subcontractor Utilization Plan or the Subcontractor Participation Goals as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of subcontracts required to be awarded to MBE and/or WBE subcontractors to meet the Subcontractor Participation Goals and the dollar amount the Contractor actually awarded and paid to MBE and/or WBE subcontractors. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the Subcontractor Participation Goals, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.

5. Whenever Agency has reason to believe that an MBE or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129), or has violated any provision of Section 6-129, Agency shall notify the commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.

6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.

7. The Contractor's record in implementing its Subcontractor Utilization Plan shall be a factor in the evaluation of its performance. Whenever a contracting agency determines that a contractor's compliance with a Subcontractor Utilization Plan has been unsatisfactory, the agency shall, after consultation with the city chief procurement officer, file an advice of caution form for inclusion in VENDEX as caution data.

IN WITNESS WHEREOF, the Commissioner, on behalf of the City of New York, and the Contractor, have executed this agreement in quadruplicate, two parts of which are to remain with the Commissioner, another to be filed with the Comptroller of the City, and the fourth to be delivered to the Contractor.

THE CITY OF NEW YORK  
By: [Signature]  
Deputy Commissioner

CONTRACTOR: National Environmental Safety Company Corp. Inc.  
By: [Signature]  
(Member of Firm or Officer of Corporation)  
Title: V.P.

(Where Contractor is a Corporation, add):  
Attest:

[Signature]  
Secretary

(Seal)

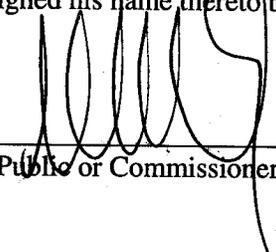
ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of New York County of Queens ss:

On this 10 day of April 2014, before me personally came MARK CAWELLOS to me known, who, being by me duly sworn did depose and say that he resides at Bayside NY that he is the V.P

of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

VICTORIA AYO-VAUGHAN  
Notary Public, State of New York  
Registration #01A/5014042  
Qualified In Queens County  
Commission Expires July 15, 2015



VICTORIA AYO-VAUGHAN  
Notary Public, State of New York  
Registration #01A/5014042  
Qualified In Queens County  
Commission Expires July 15, 2015

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, before me personally appeared \_\_\_\_\_ to me known, and known to me to be one of the members of the firm of \_\_\_\_\_

described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, before me personally appeared \_\_\_\_\_

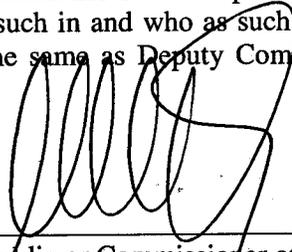
to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT BY COMMISSIONER

State of New York County of Queens ss:

On this 14<sup>th</sup> day of April, 2014, before me personally came David Resnick to me known, and known to be the Deputy Commissioner of the Department of Design and Construction of The City of New York, the person described as such in and who as such executed the foregoing instrument and he acknowledged to me that he executed the same as Deputy Commissioner for the purposes therein mentioned.



\_\_\_\_\_  
Notary Public or Commissioner of Deeds

VICTORIA AYO-VAUGHAN  
Notary Public, State of New York  
Registration #01AY5014042  
Qualified In Queens County  
Commission Expires July 15, 20 15

AUTHORITY

MAYOR'S CERTIFICATE NO. CBX  
BUDGET DIRECTOR'S CERTIFICATE NO.

DATED  
DATED

APPROPRIATION  
COMMISSIONER'S CERTIFICATE

In conformity with the provisions of Section 6-101 of the Administrative Code of the City of New York, it is hereby certified that the estimated cost of the work, materials and supplies required by the within Contract, amounting to

*Five million six hundred fifty five thousand three hundred twenty dollars*

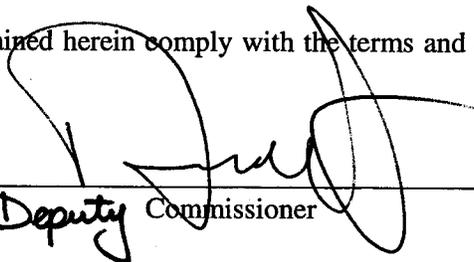
Dollars (\$ 5,655,320.00)

is chargeable to the fund of the Department of Design and Construction entitled Code

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Department of Design and Construction

I hereby certify that the specifications contained herein comply with the terms and conditions of the BUDGET.

  
\_\_\_\_\_  
Deputy Commissioner

COMPTROLLER'S CERTIFICATE

The City of New York \_\_\_\_\_

Pursuant to the provisions of Section 6-101 of the Administrative Code of the City of New York, I hereby certify that there remains unapplied and unexpended a balance of the above mentioned fund applicable to this Contract sufficient to pay the estimated expense of executing the same viz:

\$ \_\_\_\_\_

\_\_\_\_\_  
Comptroller

**MAYOR'S CERTIFICATE OR  
CERTIFICATE OF THE DIRECTOR  
OF THE BUDGET**

**Performance Bond #2 (Pages 82 to 85): Use if the total contract price is more than \$5 Million.**

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2 Bond #09133460

**KNOW ALL PERSONS BY THESE PRESENTS;**

That we, National Environmental Safety Co., Inc.

12-17 38th Avenue

Long Island City, NY 11101

hereinafter referred to as the "Principal,"

and, Fidelity & Deposit Company of Maryland

300 Interpace Pkwy.

Parsippany, NJ 07054

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns in the penal sum of Five Million Six Hundred Fifty Five Thousand Three Hundred Twenty and 00/100

(\$ 5,655,320.00 ) Dollars, lawful money of the United States for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, the Principal is about to enter, or has entered, into a Contract in writing with the City for

FMS ID: LNEMA08WS - E-PIN: 85013B0094001 - DDC PIN: 8502013LN0002C -

Woodstock Branch Library Renovation and ADA Compliance - Boro of The Bronx

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

**NOW, THEREFORE**, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making

**Performance Bond #2 (Pages 82 to 85): Use if the total contract price is more than \$5 Million.**

**PERFORMANCE BOND #2 (Page 2)**

good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

**Performance Bond #2 (Pages 82 to 85): Use if the total contract price is more than \$5 Million.**

PERFORMANCE BOND #2 (Page 3)

IN WITNESS WHEREOF, The Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this

\_\_\_\_\_ 9th \_\_\_\_\_ day of \_\_\_\_\_ April \_\_\_\_\_ 20 14 \_\_\_\_\_

(Seal)

National Environmental Safety Co., Inc. (L.S.)

Principal

By: \_\_\_\_\_ *M. Wilson* \_\_\_\_\_

(Seal)

Surety

By: \_\_\_\_\_  
Fidelity & Deposit Company of Maryland

(Seal)

Surety

By: \_\_\_\_\_ *Susan P. Hammel* \_\_\_\_\_  
Susan P. Hammel, Attorney-In-Fact

(Seal)

Surety

By: \_\_\_\_\_

(Seal)

Surety

By: \_\_\_\_\_

(Seal)

Surety

By: \_\_\_\_\_

Bond Premium Rate \_\_\_\_\_

Bond Premium Cost \_\_\_\_\_

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

**Performance Bond #2 (Pages 82 to 85): Use if the total contract price is more than \$5 Million.**

PERFORMANCE BOND #2 (Page 4)

**ACKNOWLEDGMENT OF PRINCIPAL IF A CORPORATION**

State of NY County of Queens ss:

On this 10 day of April, 2014 before me personally came Mark Canuellos,

to me known, who, being by me duly sworn did depose and say that he resides at 24-40 Little Neck Blvd Bayside NY;

that he is the V.P of the corporation described in and which executed the foregoing instrument; that he signed his/her name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

Jamie Rivera  
Notary Public or Commissioner of Deeds.

JAMIE RIVERA  
Notary Public State of New York  
Phone County  
Lic. #001321385  
Comm. Exp. August 8, 2015

**ACKNOWLEDGMENT OF PRINCIPAL IF A PARTNERSHIP**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_ before me personally came \_\_\_\_\_,

to me known, who, being by me duly sworn did depose and say that he/she resides at \_\_\_\_\_

\_\_\_\_\_ ; that he/she is \_\_\_\_\_ partner of \_\_\_\_\_, a limited/general partnership existing under the laws of the State of \_\_\_\_\_, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

**ACKNOWLEDGMENT OF PRINCIPAL IF AN INDIVIDUAL**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_ before me personally came \_\_\_\_\_,

to me known, who, being by me duly sworn did depose and say that he/she resides at \_\_\_\_\_

\_\_\_\_\_ , and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

\*\*\*\*\*

Affix Acknowledgments and Justification of Sureties.

ACKNOWLEDGEMENT OF PRINCIPAL, OF A CORPORATION

STATE OF NY

COUNTY OF Queens

ss:

On this 10 day of April, 2014 before me personally came Mark Ammos to me known, who, being by me duly sworn did depose and say that he resides at 2440 Little Neck Blvd Bayside NY 11360 that he is the V.P. of National Raw Safety Corp Inc the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

JAMIE RIVERA  
Notary Public State of New York  
Queens County  
No. #01R0248055  
Comm. Exp. August 3, 2015

*Jamie Rivera*  
Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

COUNTY OF Nassau

ss:

On this 9th day of April, 2014, before me personally came Susan P. Hammel to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Fidelity & Deposit Company of Maryland the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and said instrument and affixed the said seal as Attorney-In-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

LYNN ANN INFANTI  
Notary Public, State of New York  
No. 011N6004351  
Qualified in Suffolk County  
Commission Expires March 23, 2018

My commission expires \_\_\_\_\_

*Lynn Ann Infanti*

Notary Public

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND  
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **JAMES M. CARROLL, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Robert KEMPNER, Robert W. O'KANE, Joseph V. SFORZO, Susan P. HAMMEL and Matthew J. KELLY, all of Plainview, New York, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

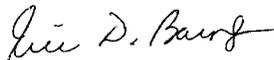
IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 31st day of January, A.D. 2014.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By:



*Assistant Secretary  
Eric D. Barnes*



*Vice President  
James M. Carroll*

State of Maryland  
City of Baltimore

On this 31st day of January, A.D. 2014, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **JAMES M. CARROLL, Vice President, and ERIC D. BARNES, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposed and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.



Maria D. Adamski, Notary Public  
My Commission Expires: July 8, 2015



**EXTRACT FROM BY-LAWS OF THE COMPANIES**

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

**CERTIFICATE**

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 9th day of April, 2014



*Geoffrey Delisio*

Geoffrey Delisio, Vice President

**FIDELITY AND DEPOSIT COMPANY**

OF MARYLAND

600 Red Brook Blvd., Suite 600, Owings Mills, MD 21117

**Statement of Financial Condition  
As Of December 31, 2013**

**ASSETS**

Bonds.....	\$ 139,272,722
Stocks .....	22,258,887
Cash and Short Term Investments.....	6,595,113
Reinsurance Recoverable .....	17,970,134
Other Accounts Receivable .....	33,409,916
<b>TOTAL ADMITTED ASSETS.....</b>	<b>\$ 219,506,772</b>

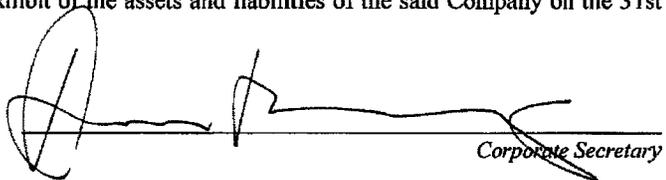
**LIABILITIES, SURPLUS AND OTHER FUNDS**

Reserve for Taxes and Expenses .....	\$ 1,787,480
Ceded Reinsurance Premiums Payable.....	42,146,005
Securities Lending Collateral Liability.....	6,613,750
<b>TOTAL LIABILITIES .....</b>	<b>\$ 50,547,235</b>
Capital Stock, Paid Up.....	\$ 5,000,000
Surplus.....	163,959,537
Surplus as regards Policyholders .....	168,959,537
<b>TOTAL.....</b>	<b>\$ 219,506,772</b>

Securities carried at \$58,378,690 in the above statement are deposited with various states as required by law.

Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of market quotations for all bonds and stocks owned, the Company's total admitted assets at December 31, 2013 would be \$223,222,696 and surplus as regards policyholders \$172,675,461.

I, DENNIS F. KERRIGAN, Corporate Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2013.

  
Corporate Secretary

State of Illinois }  
City of Schaumburg } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Illinois, in the City of Schaumburg, this 15th day of March, 2014.

  
Notary Public



**Payment Bond (Pages 86 to 89): Use for any contract for which a Payment Bond is required.**

PAYMENT BOND (Page 1)

PAYMENT BOND

Bond #09133460

KNOW ALL PERSONS BY THESE PRESENTS, That we, \_\_\_\_\_  
National Environmental Safety Co., Inc.

12-17 38th Avenue

Long Island City, NY 11101

hereinafter referred to as the "Principal", and \_\_\_\_\_  
Fidelity & Deposit Company of Maryland

300 Interpace Pkwy.

Parsippany, NJ 07054

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK,  
hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

Five Million Six Hundred Fifty Five Thousand Three Hundred Twenty and 00/100

(\$ 5,655,320.00) Dollars, lawful money of the United States, for the payment of which said sum of money well  
and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and  
assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for  
FMS ID: LNEMA08WS - E-PIN: 85013B0094001 - DDC PIN: 8502013LN0002C

Woodstock Branch Library Renovation and ADA Compliance - Boro of The Bronx

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its  
representatives or assigns and other Subcontractors to whom Work under this Contract is sublet and his or their  
successors and assigns shall promptly pay or cause to be paid all lawful claims for

(a) Wages and compensation for labor performed and services rendered by all persons engaged in  
the prosecution of the Work under said Contract, and any amendment or extension thereof or addition thereto,  
whether such persons be agents servants or employees of the Principal or any such Subcontractor, including all  
persons so engaged who perform the work of laborers or mechanics at or in the vicinity of the site

**Payment Bond (Pages 86 to 89): Use for any contract for which a Payment Bond is required.**

**PAYMENT BOND (Page 2)**

of the Project regardless of any contractual relationship between the Principal or such Subcontractors, or his or their successors or assigns, on the one hand and such laborers or mechanics on the other, but not including office employees not regularly stationed at the site of the project; and

(b) Materials and supplies (whether incorporated in the permanent structure or not), as well as teams, fuels, oils, implements or machinery furnished, used or consumed by said Principal or any subcontractor at or in the vicinity of the site of the Project in the prosecution of the Work under said Contract and any amendment or extension thereof or addition thereto; then this obligation shall be void, otherwise to remain in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

(a) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialmen or laborer having a just claim, as well as the City itself.

(b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other persons as party plaintiff.

(c) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs of otherwise, obtained by either or both of them against a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.

(d) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen's Compensation Law.

(e) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be placed in this bond.

And the Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties), and its bonds shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due to become due thereunder and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done or in relation to said Principal.

**Payment Bond (Pages 86 to 89): Use for any contract for which a Payment Bond is required.**

PAYMENT BOND (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this 9th day of April, 2014.

(Seal) National Environmental Safety Co., Inc. (L.S.)  
Principal

By: Muller

(Seal) Fidelity & Deposit Company of Maryland  
Surety

By: Susan P. Hammel  
Susan P. Hammel, Attorney-In-Fact

(Seal) \_\_\_\_\_  
Surety

By: \_\_\_\_\_

(Seal) \_\_\_\_\_  
Surety

By: \_\_\_\_\_

(Seal) \_\_\_\_\_  
Surety

By: \_\_\_\_\_

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

**Payment Bond (Pages 86 to 89):** Use for any contract for which a Payment Bond is required.

PAYMENT BOND (Page 4)

**ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION**

State of NY County of Queens ss:

On this 10 day of April, 2014, before me personally came Mark Cancellos to me known, who, being by me duly sworn did depose and say that he resides at 24-40 Little Neck Blvd Bayside NY 11360 that he is the VP of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the ~~directors~~ of said corporation, and that he signed his name thereto by like order.

Notary Public State of New York  
Queens County  
No. 20130010754  
Comm. Exp. August 3, 2015

Jamie Rivera  
Notary Public or Commissioner of Deeds

**ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally appeared \_\_\_\_\_ to me known, and known to me to be one of the members of the firm of \_\_\_\_\_ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

**ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally appeared \_\_\_\_\_ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

\*\*\*\*\*

Affix Acknowledgments and Justification of Sureties.

ACKNOWLEDGEMENT OF PRINCIPAL, OF A CORPORATION

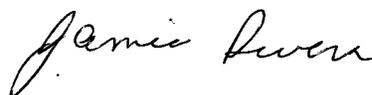
STATE OF NY

COUNTY OF Queens

ss:

On this 10 day of April, 2014 before me personally came Mark Camacho to me known, who, being by me duly sworn did depose and say that he resides at 24-40 Litchfield Blvd Bayside NY 11360 that he is the V.P of NATIONAL LAW SOCIETY INC the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to the foregoing instrument is such seal; that it was an affixed by order of the board of directors of said corporation; and that he signed his name thereto by like order.

JAMIE SWAN  
Notary Public State of New York  
Bronx County  
Lic. #018161417  
Comm. Exp. August 14, 2015



Notary Public

ACKNOWLEDGEMENT OF SURETY

STATE OF New York

COUNTY OF Nassau

ss:

On this 9th day of April, 2014, before me personally came Susan P. Hammel to me known, who, being by me duly sworn, did depose and say that he is an Attorney-In-Fact of Fidelity & Deposit Company of Maryland the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed and said instrument and affixed the said seal as Attorney-In-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

LYNN ANN INFANTI  
Notary Public, State of New York  
No. 011N6004351  
Qualified in Suffolk County  
Commission Expires March 23, 2018

My commission expires \_\_\_\_\_



Notary Public

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND  
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **JAMES M. CARROLL, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Robert KEMPNER, Robert W. O'KANE, Joseph V. SFORZO, Susan P. HAMMEL and Matthew J. KELLY, all of Plainview, New York, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York, the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 31st day of January, A.D. 2014.

**ATTEST:**

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By: Eric D. Barnes

Assistant Secretary  
Eric D. Barnes

James M. Carroll

Vice President  
James M. Carroll

State of Maryland  
City of Baltimore

On this 31st day of January, A.D. 2014, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **JAMES M. CARROLL, Vice President, and ERIC D. BARNES, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposed and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Maria D. Adamski

Maria D. Adamski, Notary Public  
My Commission Expires: July 8, 2015



**EXTRACT FROM BY-LAWS OF THE COMPANIES**

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

**CERTIFICATE**

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 9th day of April, 2014.



*Geoffrey Delisio*

Geoffrey Delisio, Vice President

**FIDELITY AND DEPOSIT COMPANY**

OF MARYLAND

600 Red Brook Blvd., Suite 600, Owings Mills, MD 21117

**Statement of Financial Condition  
As Of December 31, 2013**

**ASSETS**

Bonds.....	\$ 139,272,722
Stocks.....	22,258,887
Cash and Short Term Investments.....	6,595,113
Reinsurance Recoverable.....	17,970,134
Other Accounts Receivable.....	33,409,916
<b>TOTAL ADMITTED ASSETS.....</b>	<b>\$ 219,506,772</b>

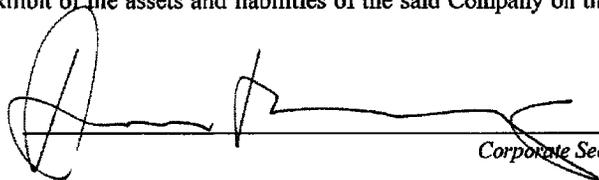
**LIABILITIES, SURPLUS AND OTHER FUNDS**

Reserve for Taxes and Expenses.....	\$ 1,787,480
Ceded Reinsurance Premiums Payable.....	42,146,005
Securities Lending Collateral Liability.....	6,613,750
<b>TOTAL LIABILITIES.....</b>	<b>\$ 50,547,235</b>
Capital Stock, Paid Up.....	\$ 5,000,000
Surplus.....	163,959,537
Surplus as regards Policyholders.....	168,959,537
<b>TOTAL.....</b>	<b>\$ 219,506,772</b>

Securities carried at \$58,378,690 in the above statement are deposited with various states as required by law.

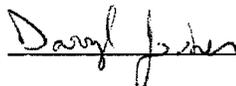
Securities carried on the basis prescribed by the National Association of Insurance Commissioners. On the basis of market quotations for all bonds and stocks owned, the Company's total admitted assets at December 31, 2013 would be \$223,222,696 and surplus as regards policyholders \$172,675,461.

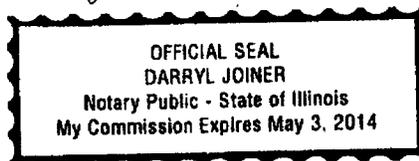
I, DENNIS F. KERRIGAN, Corporate Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company on the 31st day of December, 2013.

  
 \_\_\_\_\_  
 Corporate Secretary

State of Illinois }  
City of Schaumburg } SS:

Subscribed and sworn to, before me, a Notary Public of the State of Illinois, in the City of Schaumburg, this 15th day of March, 2014.

  
 \_\_\_\_\_  
 Notary Public



**Performance Bond #1 (Pages 80 to 83): Use if the total contract price is \$5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA") for participation in its Bond Guarantee Program.**

PERFORMANCE BOND #1 (Page 1)

PERFORMANCE BOND #1

KNOW ALL PERSONS BY THESE PRESENTS, That we, \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Principal", and \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(\$ \_\_\_\_\_) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

**Performance Bond #1 (Pages 80 to 83): Use if the total contract price is \$5 Million Or Less.**  
**Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA")**  
**for participation in its Bond Guarantee Program.**

PERFORMANCE BOND #1 (Page 2)

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to (1) pay the City the cost to complete the contract as determined by the City in excess of the balance of the Contract held by the City, plus any damages or costs to which the City is entitled, up to the full amount of the above penal sum, (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof, or (3) tender a completion Contractor that is acceptable to the City. The Surety (Sureties) further agrees, at its option, either to notify the City that it elects to pay the city the cost of completion plus any applicable damages and costs under option (1) above, or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and, if the Surety elects to fully perform and complete the Work, then to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. If the Surety elects to tender payment pursuant to (1) above, then the Surety shall tender such amount within fifteen (15) business days notification from the City of the cost of completion. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and complete all Work as provided herein, or to tender a completion contractor.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, and waivers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to subcontractors shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal. Notwithstanding the above, if the City makes payments to the Principal before the time required by the contract that in the aggregate exceed \$100,000 or 10% of the Contract price, whichever is less, and that have not become earned prior to the Principal being found to be in default, then all payments made to the Principal before the time required by the Contract shall be added to the remaining contract value available to be paid for the completion of the Contract as if such sums had not been paid to the Principal, but shall not provide a basis for non-performance of its obligation to pay the City the cost of completion, to commence and to complete all Work as provided herein, or to tender a completion contractor.

**Performance Bond #1 (Pages 80 to 83): Use if the total contract price is \$5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA") for participation in its Bond Guarantee Program.**

PERFORMANCE BOND #1 (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

(Seal) \_\_\_\_\_ (L.S.)  
Principal

By: \_\_\_\_\_

(Seal) \_\_\_\_\_  
Surety

By: \_\_\_\_\_

(Seal) \_\_\_\_\_  
Surety

By: \_\_\_\_\_

(Seal) \_\_\_\_\_  
Surety

By: \_\_\_\_\_

Bond Premium Rate \_\_\_\_\_

Bond Premium Cost \_\_\_\_\_

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

**Performance Bond #1 (Pages 80 to 83): Use if the total contract price is \$5 Million Or Less. Performance Bond #1 has been approved by the U.S. Small Business Administration ("SBA") for participation in its Bond Guarantee Program.**

PERFORMANCE BOND #1 (Page 4)

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me personally came \_\_\_\_\_ to me known, who, being by me duly sworn did depose and say that he resides at \_\_\_\_\_ that he is the \_\_\_\_\_ of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ before me personally appeared \_\_\_\_\_ to me known, and known to me to be one of the members of the firm of \_\_\_\_\_ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ before me personally appeared \_\_\_\_\_ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

\* \* \* \* \*

Affix Acknowledgments and Justification of Sureties

**Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.**

PERFORMANCE BOND #2 (Page 1)

PERFORMANCE BOND #2

KNOW ALL PERSONS BY THESE PRESENTS, That we, \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Principal", and \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(\$ \_\_\_\_\_) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

**Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.**

PERFORMANCE BOND #2 (Page2)

**NOW, THEREFORE**, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, including repair and or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the City from all cost and damage which it may suffer by reason of the Principal's default of the Contract, and shall fully reimburse and repay the City for all outlay and expense which the City may incur in making good any such default and shall protect the said City of New York against, and pay any and all amounts, damages, cost and judgments which may or shall be recovered against said City or its officers or agents or which the said City of New York may be called upon to pay any person or corporation by reason of any damages arising or growing out of the Principal's default of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety (Sureties), for value received, hereby stipulates and agrees, upon written notice from the City that the City has determined that the Principal is in default of the Contract, to either (1) pay the full amount of the above penal sum in complete discharge and exoneration of this bond and of all the liabilities of the Surety relating to this bond, or (2) fully perform and complete the Work to be performed under the Contract, pursuant to the terms, conditions, and covenants thereof. The Surety (Sureties) further agrees, at its option, either to tender the penal sum or to commence and diligently perform the Work specified in the Contract, including physical site work, within twenty-five (25) business days after written notice thereof from the City and to complete all Work within the time set forth in the Contract or such other time as agreed to between the City and Surety in accordance with the Contract. The Surety and the City reserve all rights and defenses each may have against the other; provided, however, that the Surety expressly agrees that its reservation of rights shall not provide a basis for non-performance of its obligation to commence and to complete all Work as provided herein.

The Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties) and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any Work to be performed or any moneys due or to become due thereunder; and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done by or in relation to said Principal.

**Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.**

PERFORMANCE BOND #2 (Page 3)

IN WITNESS WHEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

(Seal) \_\_\_\_\_ (L.S.)  
Principal

By: \_\_\_\_\_

(Seal) \_\_\_\_\_  
Surety

Bond Premium Rate \_\_\_\_\_

Bond Premium Cost \_\_\_\_\_

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

**Performance Bond #2 (Pages 84 to 87): Use if the total contract price is more than \$5 Million.**

PERFORMANCE BOND #2 (Page 4)

**ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ before me personally came \_\_\_\_\_ to me known, who, being by me duly sworn did depose and say that he/she resides at \_\_\_\_\_; that he/she is the \_\_\_\_\_ of \_\_\_\_\_ the corporation described in and which executed the foregoing instrument; and that he signed his name to the foregoing instrument by order of the directors of said corporation as the duly authorized and binding act thereof.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

**ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ before me personally came \_\_\_\_\_ to me known, who, being by me duly sworn did depose and say that he/she resides at \_\_\_\_\_; that he/she is \_\_\_\_\_ partner of \_\_\_\_\_, a limited/general partnership existing under the laws of the State of \_\_\_\_\_, the partnership described in and which executed the foregoing instrument; and that he/she signed his/her name to the foregoing instrument as the duly authorized and binding act of said partnership.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

**ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ before me personally came \_\_\_\_\_ to me known, who, being by me duly sworn did depose and say that he/she resides at \_\_\_\_\_, and that he/she is the individual whose name is subscribed to the within instrument and acknowledged to me that by his/her signature on the instrument, said individual executed the instrument.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

\* \* \* \* \*

Affix Acknowledgments and Justification of Sureties.

**Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.**

PAYMENT BOND (Page 1)

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we, \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Principal", and \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

hereinafter referred to as the "Surety" ("Sureties") are held and firmly bound to THE CITY OF NEW YORK, hereinafter referred to as the "City" or to its successors and assigns, in the penal sum of

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(\$ \_\_\_\_\_) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the City for

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns and other Subcontractors to whom Work under this Contract is sublet and his or their successors and assigns shall promptly pay or cause to be paid all lawful claims for

(a) Wages and compensation for labor performed and services rendered by all persons engaged in the prosecution of the Work under said Contract, and any amendment or extension thereof or addition thereto, whether such persons be agents servants or employees of the Principal or any such Subcontractor, including all persons so

**Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.**

PAYMENT BOND (Page 2)

engaged who perform the work of laborers or mechanics at or in the vicinity of the site of the Project regardless of any contractual relationship between the Principal or such Subcontractors, or his or their successors or assigns, on the one hand and such laborers or mechanics on the other, but not including office employees not regularly stationed at the site of the project; and

(b) Materials and supplies (whether incorporated in the permanent structure or not), as well as teams, fuels, oils, implements or machinery furnished, used or consumed by said Principal or any subcontractor at or in the vicinity of the site of the Project in the prosecution of the Work under said Contract and any amendment or extension thereof or addition thereto; then this obligation shall be void, otherwise to remain in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

(a) The Principal and Surety (Sureties) agree that this bond shall be for the benefit of any materialmen or laborer having a just claim, as well as the City itself.

(b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety (Sureties) herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute the suit to judgment and execution without the necessity of joining with any other persons as party plaintiff.

(c) The Principal and Surety (Sureties) agree that neither of them will hold the City liable for any judgment for costs of otherwise, obtained by either or both of them against a laborer or materialman in a suit brought by either a laborer or materialman under this bond for moneys allegedly due for performing work or furnishing material.

(d) The Surety (Sureties) or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen's Compensation Law.

(e) In no event shall the Surety (Sureties), or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety (Sureties), for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the City to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed rendered, or furnished as aforesaid upon the ground that there is no law authorizing the City to require the foregoing provisions to be placed in this bond.

And the Surety (Sureties), for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety (Sureties), and its bonds shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or of the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due to become due thereunder and said Surety (Sureties) does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, Subcontractors, and other transferees shall have the same effect as to said Surety (Sureties) as though done or omitted to be done or in relation to said Principal.

**Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.**

PAYMENT BOND (Page 3)

IN WITNESS HEREOF, the Principal and the Surety (Sureties) have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereunto affixed and these presents to be signed by their proper officers, this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

(Seal) \_\_\_\_\_ (L.S.)  
Principal

By: \_\_\_\_\_

(Seal) \_\_\_\_\_  
Surety

By: \_\_\_\_\_

If the Contractor (Principal) is a partnership, the bond should be signed by each of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Contract.

**Payment Bond (Pages 88 to 91): Use for any contract for which a Payment Bond is required.**

PAYMENT BOND (Page 4)

**ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ before me personally came \_\_\_\_\_ to me known, who, being by me duly sworn did depose and say that he resides at \_\_\_\_\_ that he is the \_\_\_\_\_ of the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

**ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ before me personally appeared \_\_\_\_\_ to me known, and known to me to be one of the members of the firm of \_\_\_\_\_ described in and who executed the foregoing instrument; and he acknowledged to me that he executed the same as and for the act and deed of said firm.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

**ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL**

State of \_\_\_\_\_ County of \_\_\_\_\_ ss:

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ before me personally appeared \_\_\_\_\_ to me known, and known to me to be the person described in and who executed the foregoing instrument; and acknowledged that he executed the same.

\_\_\_\_\_  
Notary Public or Commissioner of Deeds

Each executed bond should be accompanied by: (a) appropriate acknowledgments of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) certified copy of latest published financial statement of assets and liabilities of Surety.

\* \* \* \* \*

Affix Acknowledgments and Justification of Sureties

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

LABOR LAW §220 PREVAILING WAGE SCHEDULE

Workers, Laborers and Mechanics employed on a public work project must receive not less than the prevailing rate of wage and benefits for the classification of work performed by each upon such public work. Contractors are solely responsible for maintaining original payroll records which delineate, among other things, the hours each employee worked within a given classification. Contractors using rates and/or classifications not promulgated by the Comptroller do so at their own risk. Additionally, prior to bid, Agency Chief Contracting Officers must contact the Bureau of Labor Law when the need arises for a work classification not published in this schedule.

Pursuant to Labor Law §220 (3) the Comptroller of the City of New York has promulgated this schedule solely for Workers, Laborers and Mechanics engaged by private contractors on New York City public work contracts. Contracting agencies anticipating doing work which requires the employment of a trade or classification not included in this schedule must request the Comptroller to establish a proper classification for the work pursuant to Labor Law §220 (3-a) (a). The prevailing rate schedule as promulgated by the Comptroller, must, in compliance with law, be annexed to and form part of the contract.

The appropriate schedule of prevailing wages and benefits must be posted at all public work sites pursuant to Labor Law §220 (3-a) (a).

This schedule is applicable for work performed during the effective period, unless otherwise noted. You will be notified of any changes to this schedule by addenda published on our web site at [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov). The rate of wages and supplemental benefits to be paid or provided are those that prevail at the time the work is being performed. Preliminary schedules for future one-year periods are published annually in the City Record on or about June 1<sup>st</sup> of each succeeding year. Final schedules are published on or about July 1<sup>st</sup> in the City Record and on our web site at [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov).

The Comptroller's Office has attempted to include all overtime, shift and night differential, Holiday, Saturday, Sunday or other premium time work. However, this schedule does not set forth every prevailing practice with respect to such rates with which employers must comply. All such practices are nevertheless part of the employer's prevailing wage obligation and contained in the collective bargaining agreements of the prevailing wage unions. These collective bargaining agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classification Unit by calling (212) 669-7974. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasyl Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

Prevailing rates and ratios for apprentices are attached to this schedule in the Appendix. Pursuant to Labor Law §220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant, registered with the New York State Department of Labor, may be employed on a public work project. Workers who are not journey persons or not registered apprentices pursuant to Labor Law §220 (3-e) may not be substituted for apprentices and must be paid as journey persons.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Prevailing Rate Schedule Information:** The information below is intended to assist you in meeting your prevailing wage rate obligation.

**Covered Workers:** Any and all individuals who are engaged, employed or otherwise occupied as Workers, Laborers or Mechanics on the public work site.

Contractors are advised to review the applicable Collective Bargaining Agreements and the Comptroller's Prevailing Wage Schedule before bidding on Public Work. If there are any questions concerning prevailing wages, benefits, overtime, Holiday pay, shift differentials or any prevailing practice, please contact this office.

Public Work construction, reconstruction, demolition, excavation, rehabilitation, repair, renovation, alteration, or improvement contracts awarded pursuant to a Project Labor Agreement ("PLA") in accordance with Labor Law section 222 may have different labor standards for shift, premium and overtime work. Please refer to the PLA's pre-negotiated labor agreements for wage and benefit rates applicable to work performed outside of the regular workday. More information is available at the Mayor's Office of Contract Services (MOCS) web page at <http://www.nyc.gov/html/mocs/html/vendors/pla.shtml>.

All the provisions of Labor Law section 220 remain applicable to PLA work including, but not limited to, the enforcement of prevailing wage requirements by the Comptroller; however, we will enforce shift, premium, overtime and other non-standard rates as they appear in a project's pre-negotiated labor agreement.

Any error as to compensation under the prevailing wage law or other information as to trade classification, made by the contracting agency in the contract documents or in any other communication, will not preclude a finding against the contractor of prevailing wage violation.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

- 1) Provide bona-fide benefits which cost the employer no less than the prevailing supplemental benefits rate; or
- 2) Supplement the employee's hourly wage by an amount no less than the prevailing supplemental benefits rate; or
- 3) Provide a combination of bona-fide benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.

Particular attention should be given to the supplemental benefits requirement. Although in most instances the payment or provision for supplemental benefits is for each hour worked, some classifications require the payment or provision of supplemental benefits for each hour paid. Consequently, some prevailing practices require benefits to be purchased at the overtime, shift differential, Holiday, Saturday, Sunday or other premium time rate.

**Benefits are paid for EACH HOUR WORKED unless otherwise noted.**

Wasył Kinach, P.E.  
Director of Classifications  
Bureau of Labor Law

220 SCHEDULE OF PREVAILING WAGES AND SUPPLEMENTAL BENEFITS ADDENDUM  
EFFECTIVE PERIOD JANUARY 1, 2013 THROUGH JUNE 30, 2013

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List of Amended Classifications

1. BOILERMAKER
2. CEMENT MASON
3. DERRICKPERSON AND RIGGER
4. DRIVER: TRUCK (TEAMSTER)
5. ENGINEER - FIELD (BUILDING CONSTRUCTION)
6. ENGINEER - OPERATING
7. HEAT AND FROST INSULATOR
8. HOUSE WRECKER
9. IRON WORKER - ORNAMENTAL
10. IRON WORKER - STRUCTURAL
11. MASON TENDER
12. MASON TENDER (INTERIOR DEMOLITION WORKER)
13. MOSAIC MECHANIC
14. PAPERHANGER
15. PLASTERER
16. PLASTERER - TENDER
17. PLUMBER
18. PLUMBER (MECHANICAL EQUIPMENT AND SERVICE)
19. PLUMBER (RESIDENTIAL RATES FOR 1, 2 AND 3 FAMILY HOME CONSTRUCTION)
20. ROOFER

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

21. SHEET METAL WORKER

22. SIGN ERECTOR

23. STEAMFITTER

24. STEAMFITTER - REFRIGERATION AND AIR CONDITIONER

25. TILE FINISHER

26. TILE LAYER - SETTER

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**ASBESTOS HANDLER**

(Hazardous Material; Disturbs, removes, encapsulates, repairs, or encloses friable asbestos material)

**Asbestos Handler**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$35.10

Supplemental Benefit Rate per Hour: \$14.85

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Sunday.

Time and one half the regular hourly rate after 40 hours in any work week.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Easter

**Paid Holidays**

None

(Local #78)

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**BLASTER**

**Blaster**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$43.20

Supplemental Benefit Rate per Hour: \$37.29

**Blaster (Hydraulic)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$43.95

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$37.29

**Blaster - Trac Drill Hydraulic**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$38.96

Supplemental Benefit Rate per Hour: \$37.29

**Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$38.24

Supplemental Benefit Rate per Hour: \$37.29

**Blaster - Operators of Jack Hammers**

Chippers: Spaders: Concrete Breakers: and all other pneumatic tools of like usage: Walk Behind Self Propelled Hydraulic Asphalt and Concrete Breakers: Hydro (Water) Demolition

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.29

Supplemental Benefit Rate per Hour: \$37.29

**Blaster - Powder Carriers**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$33.73

Supplemental Benefit Rate per Hour: \$37.29

**Blaster - Hydraulic Trac Drill Chuck Tender**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$32.57

Supplemental Benefit Rate per Hour: \$37.29

**Blaster - Chuck Tender & Nipper**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$31.88

Supplemental Benefit Rate per Hour: \$37.29

**Blaster - Magazine Keepers: (Watch Person)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$19.26

Supplemental Benefit Rate per Hour: \$37.29

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

## Overtime Description

For Blaster - Magazine Keepers: (Watch Person) only - time and one half the regular rate for work after an 8 hour day, Saturday, Sunday and holidays listed below.

## Overtime

Double time the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

## Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

## Paid Holidays

None

## Shift Rates

A single shift shall be 8 hours plus an unpaid lunch, starting at 8:00 A.M. (or between 6:00 A.M. and 10:00 A.M. on weekdays). When two (2) shifts are employed, each shift shall be 8 hours plus ½ hour unpaid lunch. When three (3) shifts are employed, each shift will work seven and one-half (7 ½) hours, but will be paid for eight (8) hours, since only one-half (½) hour is allowed for mealtime. When two (2) or more shifts are employed, single time will be paid for each shift. The first 8 hours of any and all work performed Monday through Friday inclusive of any off-shift shall be at the single time rate.

(Local #29)

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## BOILERMAKER

### Boilermaker

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$47.98**

Supplemental Benefit Rate per Hour: **\$37.88**

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$56.36; For double overtime - \$74.86.

Effective Period: 1/1/2013 - 3/31/2013

Wage Rate per Hour: **\$49.47**

Supplemental Benefit Rate per Hour: **\$39.48**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$58.78; For double overtime - \$78.07.

Effective Period: 4/1/2013 - 6/30/2013

Wage Rate per Hour: \$49.47

Supplemental Benefit Rate per Hour: \$39.78

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$59.08; For double overtime - \$78.37.

### Overtime Description

For Repair and Maintenance work:

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

For New Construction work:

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Columbus Day

Election Day

Veteran's Day

Thanksgiving Day

Christmas Day

Quadruple time the regular rate for work on the following holiday(s).

Labor Day

### Paid Holidays

Good Friday

Day after Thanksgiving

Day before Christmas

Day before New Year's Day

### Shift Rates

When shifts are required, the first shift shall work eight (8) hours at the regular straight-time hourly rate. The second shift shall work seven and one-half (7 ½) hours and receive eight hours at the regular straight time hourly rate plus twenty-five cents (\$0.25) per hour. The third shift shall work seven (7) hours and receive eight hours at the regular straight time hourly rate plus fifty cents (\$0.50) per hour. A thirty (30) minute lunch period shall not be considered as time worked. Work in excess of the above shall be paid overtime at the appropriate new construction work or repair work overtime wage and supplemental benefit hourly rate.

(Local #5)

## BRICKLAYER

### Bricklayer

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.44

Supplemental Benefit Rate per Hour: \$27.53

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

### Shift Rates

Overtime rates to be paid outside the regular scheduled work day.

(Bricklayer District Council)

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## CARPENTER - BUILDING COMMERCIAL

### Building Commercial

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.15

Supplemental Benefit Rate per Hour: \$38.50

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Washington's Birthday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Paid Holidays

None

### Shift Rates

The second shift will receive one hour at the double time rate of pay for the last hour of the shift; eight hours pay for seven hours of work, nine hours pay for eight hours of work. There must be a first shift in order to work a second shift.

(Carpenters District Council)

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## CARPENTER - HEAVY CONSTRUCTION WORK (Construction of Engineering Structures and Building Foundations)

### Heavy Construction Work

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.74

Supplemental Benefit Rate per Hour: \$42.37

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

### **Paid Holidays**

None

### **Shift Rates**

Off shift work, commencing between 5:00 P.M. and 10:00 P.M. shall work eight and one half hours allowing for one half hour for lunch, but will be paid for 9 hours including benefits at the straight time rate for 8 hours.

(Carpenters District Council)

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## **CEMENT & CONCRETE WORKER**

### **Cement & Concrete Worker**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.98**

Supplemental Benefit Rate per Hour: **\$25.67**

Supplemental Note: **\$28.42 on Saturdays; \$31.17 on Sundays & Holidays**

### **Overtime Description**

Time and one half the regular rate after 7 hour day (time and one half the regular rate after an 8 hour day when working with Dockbuilders on pile cap forms and for work below street level to the top of the foundation wall, not to exceed 2 feet or 3 feet above the sidewalk-brick shelf, when working on the foundation and structure.)

### **Overtime**

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Paid Holidays**

1/2 day before Christmas Day  
1/2 day before New Year's Day

**Shift Rates**

On shift work extending over a twenty-four hour period, all shifts are paid at straight time.

(Cement Concrete Workers District Council)

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**CEMENT MASON**

**Cement Mason**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$42.50**

Supplemental Benefit Rate per Hour: **\$39.06**

Supplemental Note: Overtime supplemental benefit rate per hour: **\$57.56**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$37.63**

Supplemental Benefit Rate per Hour: **\$39.06**

Supplemental Note: Overtime supplemental benefit rate per hour: **\$57.56**

**Overtime**

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

## Shift Rates

For an off shift day, (work at times other than the regular 7:00 A.M. to 3:30 P.M. work day) a cement mason shall be paid at the regular hourly rate plus a 25% per hour differential.

(Local #780)

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## CORE DRILLER

### Core Driller

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$35.44**

Supplemental Benefit Rate per Hour: **\$19.75**

### Core Driller Helper

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$28.60**

Supplemental Benefit Rate per Hour: **\$19.75**

### Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$25.74**

Supplemental Benefit Rate per Hour: **\$19.75**

### Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$22.88**

Supplemental Benefit Rate per Hour: **\$19.75**

### Core Driller Helper (First year in the industry)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$20.02**

Supplemental Benefit Rate per Hour: **\$19.75**

## Overtime Description

Time and one half the regular rate for work on a holiday plus Holiday pay when worked.

## Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

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Double time the regular rate for Sunday.  
Time and one half the regular rate for work on the following holiday(s).

### **Paid Holidays**

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

### **Shift Rates**

The shift day shall be the continuous eight and one-half (8½) hours from 6:00 A.M. to 2:30 P.M. and from 2:30 P.M. to 11:00 P.M., including one-half (½) hour of employees regular rate of pay for lunch. When two (2) or more shifts are employed, single time shall be paid for each shift, but those employees employed on a shift other than from 8:00 A.M. to 5:00 P.M. shall, in addition, receive seventy-five cents (\$0.75) per hour differential for each hour worked. When three (3) shifts are needed, each shift shall work seven and one-half (7 ½) hours paid for eight (8) hours of labor and be permitted one-half (½) hour for mealtime.

(Carpenters District Council)

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## **DERRICKPERSON AND RIGGER**

### **Derrick Person & Rigger**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$40.50**

Supplemental Benefit Rate per Hour: **\$42.07**

Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and Queens. \$43.49 - For work performed in Staten Island.

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$41.00**

Supplemental Benefit Rate per Hour: **\$46.07**

Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and Queens. \$47.49 - For work performed in Staten Island.

### **Derrick Person & Rigger - Site Work**

For site work where no rigging is involved.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$30.00**

Supplemental Benefit Rate per Hour: **\$31.32**

### **Overtime Description**

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The first two hours of overtime on weekdays and the first seven hours of work on Saturdays are paid at time and one half for wages and supplemental benefits. All additional overtimes is paid at double time for wages and supplemental benefits. Deduct \$1.42 from the Staten Island hourly benefits rate before computing overtime.

### **Overtime**

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Washington's Birthday  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

### **Paid Holidays**

1/2 day on Christmas Eve if work is performed in the A.M.

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## **DIVER**

### **Diver (Marine)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$58.95  
Supplemental Benefit Rate per Hour: \$42.37

### **Diver Tender (Marine)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$42.10  
Supplemental Benefit Rate per Hour: \$42.37

### **Overtime**

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.  
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

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New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

**Paid Holidays**

None

**Shift Rates**

When three shifts are utilized each shift shall work seven and one half-hours (7 1/2 hours) and paid for 8 hours, allowing for one half hour for lunch.

(Carpenters District Council)

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**DOCKBUILDER - PILE DRIVER**

**Dockbuilder - Pile Driver**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.74

Supplemental Benefit Rate per Hour: \$42.37

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

**Paid Holidays**

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None

**Shift Rates**

Shift work, commencing between 5:00 P.M. and 10:00 P.M., shall work eight and one half hours allowing for one half hour for lunch but will be paid the straight time hourly wage for 9 hours and the straight time supplemental benefits for 8 hours.

(Carpenters District Council)

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**DRIVER: TRUCK (TEAMSTER)**

**Driver - Automobile Chauffeur (Dump Truck)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$35.84

Supplemental Benefit Rate per Hour: \$36.93

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$37.01

Supplemental Benefit Rate per Hour: \$38.65

**Driver - Heavy Equipment Trailer Driver**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$37.34

Supplemental Benefit Rate per Hour: \$36.93

Note: For time and one half overtime Wage Rate - \$53.76; for double time overtime Wage Rate - \$71.68

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$38.51

Supplemental Benefit Rate per Hour: \$38.65

Note: For time and one half overtime Wage Rate - \$55.51; for double time overtime Wage Rate - \$74.01

**Driver - Euclid & Turnapull Operator**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$36.41

Supplemental Benefit Rate per Hour: \$36.93

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$37.57

Supplemental Benefit Rate per Hour: \$38.65

**Driver - Six Wheeler(3 Axle) Tractors & Trailers**

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Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$36.84

Supplemental Benefit Rate per Hour: \$36.93

Note: For time and one half overtime Wage Rate - \$54.62; for double time overtime Wage Rate - \$72.82

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$38.01

Supplemental Benefit Rate per Hour: \$38.65

Note: For time and one half overtime Wage Rate - \$56.36; for double time overtime Wage Rate - \$75.14

### Driver - Boom Truck

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$37.09

Supplemental Benefit Rate per Hour: \$36.93

Note: For time and one half overtime Wage Rate - \$54.62; for double time overtime Wage Rate - \$72.82

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$38.26

Supplemental Benefit Rate per Hour: \$38.65

Note: For time and one half overtime Wage Rate - \$56.36; for double time overtime Wage Rate - \$75.14

### Overtime Description

For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay. For Thanksgiving week, the prorated share shall be 5 1/3 hours of holiday pay for each day worked in Thanksgiving week.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

President's Day

Columbus Day

Veteran's Day

Day after Thanksgiving

Triple time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

New Year's Day

President's Day

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Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

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**Driver - Redi-Mix Driver (Sand & Gravel)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$37.47**

Supplemental Benefit Rate per Hour: **\$38.65**

**Overtime Description**

For Paid Holidays: Employees working two (2) days in the calendar week in which the holiday falls are to paid for these holidays, provided they shape each remaining workday during that calendar week.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

President's Day

Columbus Day

Veteran's Day

Triple time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

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(Local #282)

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**ELECTRICIAN**

(Including all low voltage cabling carrying data; video; and voice in combination with data and or video.)

**Electrician "A" (Regular Day)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$51.00

Supplemental Benefit Rate per Hour: \$42.45

**Electrician "A" (Regular Day Overtime)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$76.50

Supplemental Benefit Rate per Hour: \$45.13

**Electrician "A" (Day Shift)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$51.00

Supplemental Benefit Rate per Hour: \$42.45

**Electrician "A" (Day Shift Overtime After 8 hours)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$76.50

Supplemental Benefit Rate per Hour: \$45.13

**Electrician "A" (Swing Shift)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$59.84

Supplemental Benefit Rate per Hour: \$48.20

**Electrician "A" (Swing Shift Overtime After 7.5 hours)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$89.76

Supplemental Benefit Rate per Hour: \$51.36

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**Electrician "A" (Graveyard Shift)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$67.03  
Supplemental Benefit Rate per Hour: \$53.07

**Electrician "A" (Graveyard Shift Overtime After 7 hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$100.55  
Supplemental Benefit Rate per Hour: \$56.60

**Overtime**

Time and one half the regular rate after a 7 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on a holiday.

New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

**Shift Rates**

When so elected by the Employer, one or more shifts of at least five days duration may be scheduled as follows:  
Day Shift: 8:00 am to 4:30 pm, Swing Shift 4:30 pm to 12:30 am, Graveyard Shift: 12:30 am to 8:00 am.

For multiple shifts of temporary light and/or power, the temporary light and/or power employee shall be paid for 8 hours at the straight time rate.

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**Electrician "M" (First 8 hours)**

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service,

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maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$25.30

Supplemental Benefit Rate per Hour: \$17.52

**Electrician "M" (Overtime After First 8 hours)**

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.95

Supplemental Benefit Rate per Hour: \$18.85

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Paid Holidays**

None

(Local #3)

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**ELECTRICIAN - ALARM TECHNICIAN**

(Scope of Work - Inspect, test, repair, and replace defective, malfunctioning, or broken devices, components and controls of Fire, Burglar and Security Systems)

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**Alarm Technician**

Effective Period: 7/1/2012 - 3/9/2013

Wage Rate per Hour: **\$29.90**

Supplemental Benefit Rate per Hour: **\$13.70**

Supplemental Note: **\$12.20** only after 8 hours worked in a day

Effective Period: 3/10/2013 - 6/30/2013

Wage Rate per Hour: **\$30.40**

Supplemental Benefit Rate per Hour: **\$13.90**

Supplemental Note: **\$12.40** only after 8 hours worked in a day

**Overtime Description**

Time and one half the regular rate for work on the following holidays: Columbus Day, Veterans Day, Day after Thanksgiving.

Double time the regular rate for work on the following holidays: New Year's day, Martin Luther King Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Paid Holidays**

- Year's Day
- Martin Luther King Jr. Day
- President's Day
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Veteran's Day
- Thanksgiving Day
- Day after Thanksgiving
- Christmas Day

**Shift Rates**

Night Differential is based upon a ten percent (10%) differential between the hours of 4:00 P.M. and 12:30 A.M. and a fifteen percent (15%) differential for the hours 12:00 A.M. to 8:00 A.M.

**Vacation**

- At least 1 year of employment.....ten (10) days
- 5 years or more of employment.....fifteen (15) days
- 10 years of employment.....twenty (20) days
- Plus one Personal Day per year

Sick Days:

One day per Year

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(Local #3)

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**ELECTRICIAN-STREET LIGHTING WORKER**

**Electrician - Electro Pole Electrician**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$51.00

Supplemental Benefit Rate per Hour: \$44.18

**Electrician - Electro Pole Foundation Installer**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$38.66

Supplemental Benefit Rate per Hour: \$34.12

**Electrician - Electro Pole Maintainer**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$33.10

Supplemental Benefit Rate per Hour: \$30.84

**Overtime Description**

Electrician - Electro Pole Electrician: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week.

Electrician - Electro Pole Foundation Installer: Time and one half the regular rate after 8 hours within a 24 hour period and Saturday and Sunday.

Electrician - Electro Pole Maintainer: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week. Saturdays and Sundays may be used as a make-up day at straight time when a day is lost during the week to inclement weather.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

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(Local #3)

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## ELEVATOR CONSTRUCTOR

### Elevator Constructor

Effective Period: 7/1/2012 - 3/16/2013

Wage Rate per Hour: **\$55.20**

Supplemental Benefit Rate per Hour: **\$32.78**

Effective Period: 3/17/2013 - 6/30/2013

Wage Rate per Hour: **\$57.01**

Supplemental Benefit Rate per Hour: **\$34.48**

### Overtime Description

For New Construction: work performed after 7 or 8 hour day, Saturday, Sunday or between 4:30pm and 7:00am shall be paid at double time rate.

Existing buildings: work performed after an 8 hour day, Saturday, Sunday or between 5:30pm and 7:00 am shall be paid time and one half.

### Overtime

Double time the regular rate for work on the following holiday(s).

### Paid Holidays

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

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## ELEVATOR REPAIR & MAINTENANCE

### Elevator Service/Modernization Mechanic

Effective Period: 7/1/2012 - 3/16/2013

Wage Rate per Hour: \$43.79

Supplemental Benefit Rate per Hour: \$31.37

Effective Period: 3/17/2013 - 6/30/2013

Wage Rate per Hour: \$45.14

Supplemental Benefit Rate per Hour: \$33.02

### Overtime Description

For Service Work: Double time - all work performed on Sundays, Holidays, and between midnight and 7:00am.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

### Paid Holidays

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### Shift Rates

For Modernization Work (4pm to 12:30am) - regularly hourly rate plus a (15%) fifteen percent differential.

### Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

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## ENGINEER

### Engineer - Heavy Construction Operating Engineer I

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Cherry pickers 20 tons and over and Loaders (rubber tired and/or tractor type with a manufacturer's minimum rated capacity of six cubic yards and over).

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$58.75

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$94.00

### Engineer - Heavy Construction Operating Engineer II

Backhoes, Basin Machines, Groover, Mechanical Sweepers, Bobcat, Boom Truck, Barrier Transport (Barrier Mover) & machines of similar nature. Operation of Churn Drills and machines of a similar nature, Stetco Silent Hoist and machines of similar nature, Vac-Alls, Meyers Machines, John Beam and machines of a similar nature, Ross Carriers and Travel Lifts and machines of a similar nature, Bulldozers, Scrapers and Turn-a-Pulls: Tugger Hoists (Used exclusively for handling excavated material); Tractors with attachments, Hyster and Roustabout Cranes, Cherry pickers. Austin Western, Grove and machines of a similar nature, Scoopmobiles, Monorails, Conveyors, Trenchers: Loaders-Rubber Tired and Tractor: Barber Greene and Eimco Loaders and Eimco Backhoes; Mighty Midget and similar breakers and Tampers, Curb and Gutter Pavers and Motor Patrol, Motor Graders and all machines of a similar nature. Locomotives 10 Tons or under. Mini-Max, Break-Tech and machines of a similar nature; Milling machines, robotic and demolition machines and machines of a similar nature, shot blaster, skid steer machines and machines of a similar nature including bobcat, pile rig rubber-tired excavator (37,000 lbs. and under), 2 man auger.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$57.00

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$91.20

### Engineer - Heavy Construction Maintenance Engineer I

Installing, Repairing, Maintaining, Dismantling and Manning of all equipment including Steel Cutting, Bending and Heat Sealing Machines, Mechanical Heaters, Grout Pumps, Bentonite Pumps & Plants, Screening Machines, Fusion Coupling Machines, Tunnel Boring Machines Moles and Machines of a similar nature, Power Packs, Mechanical Hydraulic Jacks; all drill rigs including but not limited to Churn, Rotary Caisson, Raised Bore & Drills of a similar nature; Personnel, Inspection & Safety Boats or any boats used to perform functions of same, Mine Hoists, Whirlies, all Climbing Cranes, all Tower Cranes, including but not limited to Truck Mounted and Crawler Type and machines of similar nature; Maintaining Hydraulic Drills and machines of a similar nature; Well Point System-Installation and dismantling; Burning, Welding, all Pumps regardless of size and/or motor power, except River Cofferdam Pumps and Wells Point Pumps; Motorized Buggies (three or more); equipment used in the cleaning and televising of sewers, but not limited to jet-rodder/vacuum truck, vacall/vactor, closed circuit television inspection equipment; high powered water pumps, jet pumps; screed machines and concrete finishing machines of a similar nature; vermeers.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$56.74

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$90.78

**Engineer - Heavy Construction Maintenance Engineer II**

On Base Mounted Tower Cranes

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$74.44

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$119.10

**Engineer - Heavy Construction Maintenance Engineer III**

On Generators, Light Towers

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.56

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$60.10

**Engineer - Heavy Construction Maintenance Engineer IV**

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$38.53

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$61.65

**Engineer - Heavy Construction Operating Engineer III**

Minor Equipment such as Tractors, Post Hole Diggers, Ditch Witch (Walk Behind), Road Finishing Machines, Rollers five tons and under, Tugger Hoists, Dual Purpose Trucks, Fork Lifts, and Dempsey Dumpers, Fireperson.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$54.09

Supplemental Benefit Rate per Hour: \$31.07

Supplemental Note: \$55.74 on overtime

Shift Wage Rate: \$86.54

**Engineer - Heavy Construction Oilers I**

Gradalls, Cold Planer Grader, Concrete Pumps, Driving Truck Cranes, Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$51.19

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Supplemental Benefit Rate per Hour: \$31.07  
Supplemental Note: \$55.74 on overtime  
Shift Wage Rate: \$81.90

**Engineer - Heavy Construction Oilers II**

All gasoline, electric, diesel or air operated Shovels, Draglines, Backhoes, Keystones, Pavers, Gunitite Machines, Battery of Compressors, Crawler Cranes, two-person Trenching Machines.

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$35.50  
Supplemental Benefit Rate per Hour: \$31.07  
Supplemental Note: \$55.74 on overtime  
Shift Wage Rate: \$56.80

**Engineer - Steel Erection Maintenance Engineers**

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$54.33  
Supplemental Benefit Rate per Hour: \$29.66  
Supplemental Note: \$53.17 on overtime  
Shift Wage Rate: \$86.93

**Engineer - Steel Erection Oiler I**

On a Truck Crane

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$50.91  
Supplemental Benefit Rate per Hour: \$29.66  
Supplemental Note: \$53.17 on overtime  
Shift Wage Rate: \$81.46

**Engineer - Steel Erection Oiler II**

On a Crawler Crane

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$39.04  
Supplemental Benefit Rate per Hour: \$29.66  
Supplemental Note: \$53.17 on overtime  
Shift Wage Rate: \$62.46

**Overtime Description**

On jobs of more than one shift, if the next shift employee fails to report for work through any cause over which the employer has no control, the employee on duty who works the next shift continues to work at the single time rate.

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**Overtime**

Double time the regular rate after an 8 hour day.  
Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.  
Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day  
Lincoln's Birthday  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

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**Engineer - Building Work Maintenance Engineers I**

Installing, repairing, maintaining, dismantling (of all equipment including: Steel Cutting and Bending Machines, Mechanical Heaters, Mine Hoists, Climbing Cranes, Tower Cranes, Linden Peine, Lorain, Liebherr, Mannes, or machines of a similar nature, Well Point Systems, Deep Well Pumps, Concrete Mixers with loading Device, Concrete Plants, Motor Generators when used for temporary power and lights), skid steer machines of a similar nature including bobcat.

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$51.62  
Supplemental Benefit Rate per Hour: \$29.66  
Supplemental Note: \$53.17 on overtime

**Engineer - Building Work Maintenance Engineers II**

On Pumps, Generators, Mixers and Heaters

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$40.34  
Supplemental Benefit Rate per Hour: \$29.66  
Supplemental Note: \$53.17 on overtime

**Engineer - Building Work Oilers I**

All gasoline, electric, diesel or air operated Gradealls: Concrete Pumps, Overhead Cranes in Power Houses: Their duties shall be to assist the Engineer in oiling, greasing and repairing of all machines; Driving Truck

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Cranes: Driving and Operating Fuel and Grease Trucks, Cherrypickers (hydraulic cranes) over 70,000 GVW, and machines of a similar nature.

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$49.12  
Supplemental Benefit Rate per Hour: \$29.66  
Supplemental Note: \$53.17 on overtime

**Engineer - Building Work Oilers II**

Oilers on Crawler Cranes, Backhoes, Trenching Machines, Gunite Machines, Compressors (three or more in Battery).

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$36.75  
Supplemental Benefit Rate per Hour: \$29.66  
Supplemental Note: \$53.17 on overtime

**Overtime Description**

On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

**Overtime**

Double time the regular rate after an 8 hour day.  
Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.  
Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day  
Lincoln's Birthday  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

**Shift Rates**

Off Shift: double time the regular hourly rate.

(Local #15)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**ENGINEER - CITY SURVEYOR AND CONSULTANT**

**Party Chief**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$34.61

Supplemental Benefit Rate per Hour: \$17.30

**Instrument Person**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$28.59

Supplemental Benefit Rate per Hour: \$17.30

**Rodperson**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$24.79

Supplemental Benefit Rate per Hour: \$17.30

**Overtime Description**

Overtime Benefit Rate - \$23.63 per hour (time & one half) \$29.95 per hour (double time).

Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

**Paid Holidays**

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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**ENGINEER - FIELD (BUILDING CONSTRUCTION)**  
**(Construction of Building Projects, Concrete Superstructures, etc.)**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

**Field Engineer - BC Party Chief**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$53.64

Supplemental Benefit Rate per Hour: \$26.95

Supplemental Note: Overtime Benefit Rate - \$37.48 per hour (time & one half) \$48.00 per hour (double time).

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$55.74

Supplemental Benefit Rate per Hour: \$29.73

Supplemental Note: Overtime Benefit Rate - \$41.40 per hour (time & one half) \$53.06 per hour (double time).

**Field Engineer - BC Instrument Person**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$41.94

Supplemental Benefit Rate per Hour: \$26.95

Supplemental Note: Overtime Benefit Rate - \$37.48 per hour (time & one half) \$48.00 per hour (double time).

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$43.30

Supplemental Benefit Rate per Hour: \$29.73

Supplemental Note: Overtime Benefit Rate - \$41.40 per hour (time & one half) \$53.06 per hour (double time).

**Field Engineer - BC Rodperson**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$27.52

Supplemental Benefit Rate per Hour: \$26.95

Supplemental Note: Overtime Benefit Rate - \$37.48 per hour (time & one half) \$48.00 per hour (double time).

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$27.97

Supplemental Benefit Rate per Hour: \$29.73

Supplemental Note: Overtime Benefit Rate - \$41.40 per hour (time & one half) \$53.06 per hour (double time).

**Overtime Description**

Time and one half the regular rate after a 7 hour work and time and one half the regular rate for Saturday for the first seven hours worked, Double time the regular time rate for Saturday for work performed in excess of seven hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

**Paid Holidays**

- New Year's Day
- President's Day
- Good Friday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Veteran's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Thanksgiving Day  
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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**ENGINEER - FIELD (HEAVY CONSTRUCTION)**  
(Construction of Roads, Tunnels, Bridges, Sewers, Building Foundations,  
Engineering Structures etc.)

**Field Engineer - HC Party Chief**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$60.28**

Supplemental Benefit Rate per Hour: **\$29.73**

Supplemental Note: Overtime benefit rate - \$41.40 per hour (time & one half), \$53.06 per hour (double time).

**Field Engineer - HC Instrument Person**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$44.28**

Supplemental Benefit Rate per Hour: **\$29.73**

Supplemental Note: Overtime benefit rate - \$41.40 per hour (time & one half), \$53.06 per hour (double time).

**Field Engineer - HC Rodperson**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$37.11**

Supplemental Benefit Rate per Hour: **\$29.73**

Supplemental Note: Overtime benefit rate - \$41.40 per hour (time & one half), \$53.06 per hour (double time).

**Overtime Description**

Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

**Paid Holidays**

New Year's Day  
Lincoln's Birthday  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Thanksgiving Day  
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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## ENGINEER - FIELD (STEEL ERECTION)

### Field Engineer - Steel Erection Party Chief

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$54.50

Supplemental Benefit Rate per Hour: \$26.95

Supplemental Note: Overtime benefit rate - \$37.48 per hour (time & one half), \$48.00 per hour (double time).

### Field Engineer - Steel Erection Instrument Person

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$42.63

Supplemental Benefit Rate per Hour: \$26.95

Supplemental Note: Overtime benefit rate - \$37.48 per hour (time & one half), \$48.00 per hour (double time).

### Field Engineer - Steel Erection Rodperson

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$28.84

Supplemental Benefit Rate per Hour: \$26.95

Supplemental Note: Overtime benefit rate - \$37.48 per hour (time & one half), \$48.00 per hour (double time).

## Overtime Description

Time and one half the regular rate for Saturday for the first eight hours worked.

Double time the regular rate for Saturday for work performed in excess of eight hours.

## Overtime

Time and one half the regular rate after an 8 hour day.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

## Paid Holidays

New Year's Day  
Lincoln's Birthday  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Veteran's Day  
Thanksgiving Day  
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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## **ENGINEER - OPERATING**

### **Operating Engineer - Road & Heavy Construction I**

Back Filling Machines, Cranes, Mucking Machines and Dual Drum Paver.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$64.38

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$103.01

### **Operating Engineer - Road & Heavy Construction II**

Backhoes, Power Shovels, Hydraulic Clam Shells, Steel Erection, Moles and machines of a similar nature.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$66.70

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: 51.85 overtime hours

Shift Wage Rate: \$106.72

### **Operating Engineer - Road & Heavy Construction III**

Mine Hoists, Cranes, etc. (Used as Mine Hoists)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$68.86

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$110.18

### **Operating Engineer - Road & Heavy Construction IV**

Gradealls, Keystones, Cranes on land or water (with digging buckets), Bridge Cranes, Vermeer Cutter and machines of a similar nature, Trenching Machines.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$67.21

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Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$107.54**

**Operating Engineer - Road & Heavy Construction V**

Pile Drivers & Rigs (employing Dock Builder foreperson): Derrick Boats, Tunnel Shovels.

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$65.86**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$105.38**

**Operating Engineer - Road & Heavy Construction VI**

Mixers (Concrete with loading attachment), Concrete Pavers, Cableways, Land Derricks, Power Houses (Low Air Pressure Units).

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$62.51**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$100.02**

**Operating Engineer - Road & Heavy Construction VII**

Barrier Movers , Barrier Transport and Machines of a Similar Nature.

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$50.27**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$80.43**

**Operating Engineer - Road & Heavy Construction VIII**

Utility Compressors

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$36.37**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$46.38**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$38.78**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours

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Shift Wage Rate: \$49.16

**Operating Engineer - Road & Heavy Construction IX**

Horizontal Boring Rig

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$56.24

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$89.98

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$59.39

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$95.02

**Operating Engineer - Road & Heavy Construction X**

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$54.50

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$87.20

**Operating Engineer - Road & Heavy Construction XI**

Compressors (Portable 3 or more in battery), Driving of Truck Mounted Compressors, Well-point Pumps, Tugger Machines Well Point Pumps, Churn Drill.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$42.11

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$67.38

**Operating Engineer - Road & Heavy Construction XII**

All Drills and Machines of a similar nature.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$63.18

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$101.09

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**Operating Engineer - Road & Heavy Construction XIII**

Concrete Pumps, Concrete Plant, Well Drilling Machines, Stone Crushers, Double Drum Hoist, Power Houses (other than above).

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$61.14

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$97.82

**Operating Engineer - Road & Heavy Construction XIV**

Concrete Mixer

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$58.34

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$93.49

**Operating Engineer - Road & Heavy Construction XV**

Compressors (Portable Single or two in Battery, not over 100 feet apart), Pumps (River Cofferdam) and Welding Machines, Push Button Machines, All Engines Irrespective of Power (Power-Pac) used to drive auxiliary equipment, Air, Hydraulic, etc.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$39.03

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$62.45

**Operating Engineer - Road & Heavy Construction XVI**

Concrete Breaking Machines, Single Drum Hoists, Locomotives (over ten tons) and Dinkies over ten tons, Hydraulic Crane-Second Engineer.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$55.73

Supplemental Benefit Rate per Hour: \$28.65

Supplemental Note: \$51.85 overtime hours

Shift Wage Rate: \$89.17

**Operating Engineer - Road & Heavy Construction XVII**

On-Site concrete plant engineer, On-site Asphalt Plant Engineer, and Vibratory console.

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Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$56.19**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$89.90**

**Operating Engineer - Road & Heavy Construction XVIII**

Tower Crane

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$81.09**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$129.74**

**Operating Engineer - Paving I**

Asphalt Spreaders, Autogrades (C.M.I.), Roto/Mil

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$59.25**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$94.80**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$62.51**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$100.02**

**Operating Engineer - Paving II**

Asphalt Roller

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$57.65**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$92.24**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$60.85**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$97.36**

**Operating Engineer - Paving III**

**Asphalt Plants**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$48.46**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$77.54**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$51.32**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$82.11**

**Operating Engineer - Concrete I**

**Cranes**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$63.49**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**

**Operating Engineer - Concrete II**

**Compressors**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$36.91**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**

**Operating Engineer - Concrete III**

Micro-traps (Negative Air Machines), Vac-All Remediation System.

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: **\$50.31**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**

**Operating Engineer - Steel Erection I**

**Three Drum Derricks**

Effective Period: 7/1/2012 - 12/31/2012

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Wage Rate per Hour: **\$67.62**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$108.19**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$70.50**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$112.80**

**Operating Engineer - Steel Erection II**

Cranes, 2 Drum Derricks, Hydraulic Cranes and Fork Lifts.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$64.91**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$103.86**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$67.71**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$108.34**

**Operating Engineer - Steel Erection III**

Compressors, Welding Machines.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$37.87**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$60.59**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$39.86**  
Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85 overtime hours**  
Shift Wage Rate: **\$63.78**

**Operating Engineer - Steel Erection IV**

Compressors - Not Combined with Welding Machine.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$36.00**

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Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$57.60**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$37.93**

Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours  
Shift Wage Rate: **\$60.69**

### Operating Engineer - Building Work I

Forklifts, House Cars, Rack and Pinion, Plaster (Platform machine), Plaster Bucket, Concrete Pump and all other equipment used for hoisting material.

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$53.09**

Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$55.46**

Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours

### Operating Engineer - Building Work II

Compressors, Welding Machines (Cutting Concrete-Tank Work), Paint Spraying, Sandblasting, Pumps (with the exclusion of Concrete Pumps), House Car (settlement basis only), All Engines irrespective of Power (Power-Pac) used to drive Auxiliary Equipment, Air, Hydraulic, etc.

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$39.35**

Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$41.32**

Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours

### Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$60.66**

Supplemental Benefit Rate per Hour: **\$28.65**  
Supplemental Note: **\$51.85** overtime hours

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$63.25  
Supplemental Benefit Rate per Hour: \$28.65  
Supplemental Note: \$51.85 overtime hours

**Operating Engineer - Building Work IV**

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$64.35  
Supplemental Benefit Rate per Hour: \$28.65  
Supplemental Note: \$51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$67.05  
Supplemental Benefit Rate per Hour: \$28.65  
Supplemental Note: \$51.85 overtime hours

**Operating Engineer - Building Work V**

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$59.17  
Supplemental Benefit Rate per Hour: \$28.65  
Supplemental Note: \$51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$61.72  
Supplemental Benefit Rate per Hour: \$28.65  
Supplemental Note: \$51.85 overtime hours

**Operating Engineer - Building Work VI**

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$58.53  
Supplemental Benefit Rate per Hour: \$28.65  
Supplemental Note: \$51.85 overtime hours

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$61.06  
Supplemental Benefit Rate per Hour: \$28.65  
Supplemental Note: \$51.85 overtime hours

**Overtime Description**

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On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

### Overtime

- Double time the regular rate after an 8 hour day.
- Double time the regular time rate for Saturday.
- Double time the regular rate for Sunday.
- Double time the regular rate for work on the following holiday(s).

### Paid Holidays

- New Year's Day
- Lincoln's Birthday
- President's Day
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Veteran's Day
- Thanksgiving Day
- Day after Thanksgiving
- Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

### Shift Rates

Shifts may be worked at the single time rate at other than the regular working hours (8:00 A.M. to 4:30 P.M.) on the following work ONLY: Heavy construction jobs on work below the street level, over railroad tracks and on building jobs.

(Operating Engineer Local #14)

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## FLOOR COVERER

(Interior vinyl composition tile, sheath vinyl linoleum and wood parquet tile including site preparation and synthetic turf not including site preparation)

### Floor Coverer

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.15

Supplemental Benefit Rate per Hour: \$38.50

### Overtime

- Time and one half the regular rate after an 8 hour day.
- Time and one half the regular rate for Saturday.
- Double time the regular rate for Sunday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.  
1/2 day on New Year's Eve if work is performed in the A.M.

### Shift Rates

Two shifts may be utilized with the first shift working 8:00 A.M. to the end of the shift at the straight time of pay. The second shift will receive one hour at double time rate for the last hour of the shift. (eight for seven, nine for eight).

(Carpenters District Council)

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## GLAZIER (New Construction, Remodeling, and Alteration)

### Glazier

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: **\$40.00**

Supplemental Benefit Rate per Hour: **\$32.89**

Supplemental Note: Supplemental Benefit Overtime Rate: **\$40.54**

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: **\$40.50**

Supplemental Benefit Rate per Hour: **\$33.24**

Supplemental Note: Supplemental Benefit Overtime Rate: **\$41.24**

### Overtime Description

An optional 8th hour can be worked at straight time rate. If 9th hour is worked, then both hours or more (8th & 9th or more) will be at the double time rate of pay.

### Overtime

Double time the regular rate after a 7 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Paid Holidays

None

### Shift Rates

Shifts shall be any 7 hours beyond 4:00 P.M. for which the glazier shall receive 8 hours pay for 7 hours worked.

(Local #1281)

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## GLAZIER - REPAIR & MAINTENANCE

For the Installation of Glass - All repair and maintenance work on a particular building, whenever performed, where the total cumulative contract value is under \$105,000. Except where enumerated (i.e. plate glass windows) does not apply to non-residential buildings.)

### Craft Jurisdiction for repair, maintenance and fabrication

Plate glass replacement, Residential glass replacement, Residential mirrors and shower doors, Storm windows and storm doors, Residential replacement windows, Herculite door repairs, Door closer repairs, Retrofit apartment house (non commercial buildings), Glass tinting.

Effective Period: 7/1/2012 - 4/30/2013

Wage Rate per Hour: \$23.40

Supplemental Benefit Rate per Hour: \$18.04

Effective Period: 5/1/2013 - 6/30/2013

Wage Rate per Hour: \$23.50

Supplemental Benefit Rate per Hour: \$18.54

### Overtime

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Double time the regular rate for Sunday.  
Time and one half the regular hourly rate after 40 hours in any work week.

### **Paid Holidays**

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

(Local #1281)

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## **HEAT AND FROST INSULATOR**

### **Heat & Frost Insulator**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$54.28**  
Supplemental Benefit Rate per Hour: **\$31.36**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$55.98**  
Supplemental Benefit Rate per Hour: **\$32.36**

### **Overtime Description**

Double time shall be paid for supplemental benefits during overtime work.  
8th hour paid at time and one half.

### **Overtime**

Double time the regular rate after an 8 hour day.  
Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).  
New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Christmas Day

Triple time the regular rate for work on the following holiday(s).

Memorial Day

**Paid Holidays**

None

**Shift Rates**

The first shift shall work seven hours at the regular straight time rate. The second and third shift shall work seven hours the regular straight time hourly rate plus a fourteen percent wage and benefit premium. Off hour work in occupied or retail buildings may be worked on weekdays with an increment of \$1.00 per hour and eight hours pay for seven (7) hours worked. Double time will apply for over seven (7) hours worked on weekdays, weekends or holidays.

(Local #12)

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**HOUSE WRECKER  
(TOTAL DEMOLITION)**

**House Wrecker - Tier A**

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$33.00  
Supplemental Benefit Rate per Hour: \$24.15

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$33.51  
Supplemental Benefit Rate per Hour: \$24.64

**House Wrecker - Tier B**

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$23.05  
Supplemental Benefit Rate per Hour: \$17.85

Effective Period: 1/1/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$23.25**

Supplemental Benefit Rate per Hour: **\$18.35**

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

(Mason Tenders District Council)

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## IRON WORKER - ORNAMENTAL

### Iron Worker - Ornamental

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$41.50**

Supplemental Benefit Rate per Hour: **\$39.52**

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$42.00**

Supplemental Benefit Rate per Hour: **\$42.89**

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

### Overtime Description

Time and one half the regular rate after a 7 hour day for a maximum of two hours on any regular work day (the 8th and 9th hour) and double time shall be paid for all work on a regular work day thereafter, time and one half the regular rate for Saturday for the first seven hours of work and double time shall be paid for all work on a Saturday thereafter.

### Overtime

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

### Paid Holidays

None

### Shift Rates

For off shift work - 8 hours pay for 7 hours of work. When two or three shifts are employed on a job, Monday through Friday, the workday for each shift shall be seven hours and paid for ten and one-half hours at the single time rate. When two or three shifts are worked on Saturday, Sunday or holidays, each shift shall be seven hours and paid fifteen and three-quarters hours.

(Local #580)

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## IRON WORKER - STRUCTURAL

### Iron Worker - Structural

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$45.05

Supplemental Benefit Rate per Hour: \$57.85

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$46.00

Supplemental Benefit Rate per Hour: \$61.23

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

### Overtime Description

Monday through Friday- the first eight hours are paid at straight time, the 9th and 10th hours are paid at time and one-half the regular rate, all additional weekday overtime is paid at double the regular rate. Saturdays- the first eight hours are paid at time and one-half the regular rate, double time thereafter. Sunday-all shifts are paid at double time.

### Overtime

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

### Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.  
1/2 day on New Year's Eve if work is performed in the A.M.

### Shift Rates

Monday through Friday - First Shift: First eight hours are paid at straight time, the 9th & 10th hours are paid at time and a half, double time paid thereafter. Second and third Shifts: First eight hours are paid at time and one-half, double time thereafter. Saturdays: All shifts, first eight hours paid at time and one-half, double time thereafter: Sunday all shifts are paid at double time.

(Local #40 & #361)

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## LABORER

(Foundation, Concrete, Excavating, Street Pipe Layer and Common)

### Laborer

Excavation and foundation work for buildings, heavy construction, engineering work, and hazardous waste removal in connection with the above work. Landscaping tasks in connection with heavy construction work, engineering work and building projects. Projects include, but are not limited to pollution plants, sewers, parks, subways, bridges, highways, etc.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.70**

Supplemental Benefit Rate per Hour: **\$31.75**

### Overtime

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

**Paid Holidays**

Labor Day  
Thanksgiving Day

**Shift Rates**

When two shifts are employed, single time rate shall be paid for each shift. When three shifts are found necessary, each shift shall work seven and one half hours (7 ½), but shall be paid for eight (8) hours of labor, and be permitted one half hour for lunch.

(Local #731)

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**LANDSCAPING**

(Landscaping tasks, as well as tree pruning, tree removing, spraying and maintenance in connection with the planting of street trees and the planting of trees in city parks but not when such activities are performed as part of, or in connection with, other construction or reconstruction projects.)

**Landscaper (Above 6 years experience)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$24.25  
Supplemental Benefit Rate per Hour: \$12.30

**Landscaper (3 - 6 years experience)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$23.25  
Supplemental Benefit Rate per Hour: \$12.30

**Landscaper (up to 3 years experience)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$20.75  
Supplemental Benefit Rate per Hour: \$12.30

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Groundperson**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$20.75

Supplemental Benefit Rate per Hour: \$12.30

**Tree Remover / Pruner**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$29.25

Supplemental Benefit Rate per Hour: \$12.30

**Landscaper Sprayer (Pesticide Applicator)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$19.25

Supplemental Benefit Rate per Hour: \$12.30

**Watering - Plant Maintainer**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$14.25

Supplemental Benefit Rate per Hour: \$12.30

**Overtime Description**

For all overtime work performed, supplemental benefits shall include an additional seventy-five (\$0.75) cents per hour.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

**Paid Holidays**

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Shift Rates**

Work performed on a 4pm to 12am shift has a 15% differential. Work performed on a 12am to 8am shift has a 20% differential.

(Local #175)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

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## **MARBLE MECHANIC**

### **Marble Setter**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$49.19**

Supplemental Benefit Rate per Hour: **\$32.24**

### **Marble Finisher**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$39.05**

Supplemental Benefit Rate per Hour: **\$31.43**

### **Marble Polisher**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$34.73**

Supplemental Benefit Rate per Hour: **\$24.60**

### **Overtime Description**

Supplemental Benefit contributions are to be made at the applicable overtime rates. Time and one half the regular rate after a 7 hour day or time and one half the regular rate after an 8 hour day - chosen by Employer at the start of the project and then would last for the full duration of the project.

### **Overtime**

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### **Paid Holidays**

None

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

(Local #7)

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## MASON TENDER

### Mason Tender

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$34.24**

Supplemental Benefit Rate per Hour: **\$24.40**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$34.50**

Supplemental Benefit Rate per Hour: **\$25.14**

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

The Employer may work two (2) shifts with the first shift at the straight time wage rate and the second shift receiving eight (8) hours paid for seven (7) hours work at the straight time wage rate.

(Local #79)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**MASON TENDER (INTERIOR DEMOLITION WORKER)**

(The erection, building, moving, servicing and dismantling of enclosures, scaffolding, barricades, protection and site safety structures etc., on Interior Demolition jobs.)

**Mason Tender Tier A**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$33.87**

Supplemental Benefit Rate per Hour: **\$19.22**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$34.07**

Supplemental Benefit Rate per Hour: **\$19.77**

**Mason Tender Tier B**

On Interior Demolition job sites 33 1/3 % of the employees shall be classified as Tier A Interior Demolition Workers and 66 2/3 % shall be classified as Tier B Interior Demolition Workers; provided that the employer may employ more than 33 1/3 % Tier A Interior Demolition Workers on the job site. Where the number of employees on a job site is not divisible by 3, the first additional employee (above the number of employees divisible by three) shall be a Tier B Interior Demolition Worker, and the second additional employee shall be a Tier A Interior Demolition Worker.

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$23.07**

Supplemental Benefit Rate per Hour: **\$13.53**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$23.27**

Supplemental Benefit Rate per Hour: **\$14.08**

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

(Local #79)

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## METALLIC LATHER

### Metallic Lather

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$41.23

Supplemental Benefit Rate per Hour: \$38.35

Supplemental Note: Supplemental benefits for overtime are paid at the appropriate overtime rate.

### Overtime Description

Overtime would be time and one half the regular rate after a seven (7) or eight (8) hours workday, which would be set at the start of the job.

### Overtime

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

1/2 day on New Year's Eve if work is performed in the A.M.

### Shift Rates

There shall be either two (2) or three (3) shifts, each shift shall be eight (8) hours with nine (9) hours pay, including one half (1/2) hour for lunch. Off-Hour Start shall commence after 3:30 P.M. and shall conclude by 6:00 A.M. The first consecutive seven (7) hours shall be at straight time with a differential of twelve dollars (\$12.00) per hour. Fringes shall be paid at the straight time rate.

(Local #46)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

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## MILLWRIGHT

### Millwright

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$46.19

Supplemental Benefit Rate per Hour: \$45.67

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

1/2 day on New Year's Eve if work is performed in the A.M.

### Shift Rates

The first shift shall receive the straight time rate of pay. The second shift receives the straight time rate of pay plus fifteen (15%) per cent. Members of the second shift shall be allowed one half hour to eat, with this time being included in the hours of the workday established. There must be a first shift to work a second shift. All additional hours worked shall be paid at the time and one-half rate of pay plus fifteen (15%) per cent for weekday hours.

(Local #740)

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## MOSAIC MECHANIC

### Mosaic Mechanic - Mosaic & Terrazzo Mechanic

Effective Period: 7/1/2012 - 12/31/2012

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$43.93**

Supplemental Benefit Rate per Hour: **\$33.08**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$44.05 per hour.

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$44.39**

Supplemental Benefit Rate per Hour: **\$35.12**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.09 per hour.

**Mosaic Mechanic - Mosaic & Terrazzo Finisher**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$42.36**

Supplemental Benefit Rate per Hour: **\$33.08**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$44.05 per hour.

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$42.78**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

**Mosaic Mechanic - Machine Operator Grinder**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$42.36**

Supplemental Benefit Rate per Hour: **\$33.08**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$44.05 per hour.

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$42.78**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

**Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Good Friday

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

## **Paid Holidays**

(Local #7)

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## **PAINTER**

### **Painter - Brush & Roller**

Effective Period: 7/1/2012 - 10/31/2012  
Wage Rate per Hour: **\$35.50**  
Supplemental Benefit Rate per Hour: **\$25.12**  
Supplemental Note: \$29.75 on overtime

Effective Period: 11/1/2012 - 4/30/2013  
Wage Rate per Hour: **\$36.00**  
Supplemental Benefit Rate per Hour: **\$25.12**  
Supplemental Note: \$29.75 on overtime

Effective Period: 5/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$37.50**  
Supplemental Benefit Rate per Hour: **\$25.12**  
Supplemental Note: \$29.75 on overtime

### **Spray & Scaffold / Decorative / Sandblast**

Effective Period: 7/1/2012 - 10/31/2012  
Wage Rate per Hour: **\$38.50**  
Supplemental Benefit Rate per Hour: **\$25.12**  
Supplemental Note: \$29.75 on overtime

Effective Period: 11/1/2012 - 4/30/2013  
Wage Rate per Hour: **\$39.00**  
Supplemental Benefit Rate per Hour: **\$25.12**  
Supplemental Note: \$29.75 on overtime

Effective Period: 5/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$40.50**  
Supplemental Benefit Rate per Hour: **\$25.12**  
Supplemental Note: \$29.75 on overtime

## **Overtime**

Time and one half the regular rate after a 7 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Thanksgiving Day  
Christmas Day

**Paid Holidays**

None

(District Council of Painters #9)

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**PAINTER - SIGN**

**Designer**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$36.15**

Supplemental Benefit Rate per Hour: **\$9.66**

**Journey person**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$33.62**

Supplemental Benefit Rate per Hour: **\$9.66**

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Thanksgiving Day  
Day after Thanksgiving

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Christmas Day

**Shift Rates**

Work performed outside the regular 8 hour work day (either 7:00 A.M to 3:30 P.M or 8:00 A.M. to 4:30 P.M) shall be paid at time and one half the regular hourly rate.

(Local #8A-28A)

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**PAINTER - STRIPER**

**Striper (paint)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$33.00**

Supplemental Benefit Rate per Hour: **\$11.52**

Supplemental Note: Overtime Supplemental Benefit rate - \$7.42; New Hire Rate (0-3 months) - \$0.00

**Lineperson (thermoplastic)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$37.00**

Supplemental Benefit Rate per Hour: **\$11.52**

Supplemental Note: Overtime Supplemental Benefit rate - \$7.42; New Hire Rate (0-3 months) - \$0.00

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Shift Rates**

Employees hired before April 1, 2003: 15% night shift premium differential for work commenced at 9:00 PM or later.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

## Vacation

Employees with one to two years service shall accrue vacation based on hours worked: 250 hours worked - 1 day vacation; 500 hours worked - 2 days vacation; 750 hours worked - 3 days vacation; 900 hours worked - 4 days vacation; 1,000 hours worked - 5 days vacation. Employees with two to five years service receive two weeks vacation. Employees with five to twenty years service receive three weeks vacation. Employees with twenty to twenty-five years service receive four weeks vacation. Employees with 25 or more years service receive five weeks vacation. Vacation must be taken during winter months. 2 Personal Days except employees hired after 4/1/12 who do not have 2 years of service.

(Local #917)

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## PAINTER - STRUCTURAL STEEL

### Painters on Structural Steel

Effective Period: 7/1/2012 - 9/30/2012

Wage Rate per Hour: **\$46.25**

Supplemental Benefit Rate per Hour: **\$31.58**

Effective Period: 10/1/2012 - 6/30/2013

Wage Rate per Hour: **\$47.00**

Supplemental Benefit Rate per Hour: **\$32.08**

### Painter - Power Tool

Effective Period: 7/1/2012 - 9/30/2012

Wage Rate per Hour: **\$52.25**

Supplemental Benefit Rate per Hour: **\$31.58**

Effective Period: 10/1/2012 - 6/30/2013

Wage Rate per Hour: **\$53.00**

Supplemental Benefit Rate per Hour: **\$32.08**

## Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

## Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Paid Holidays**

None

**Shift Rates**

Regular hourly rates plus a ten per cent (10%) differential

(Local #806)

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**PAPERHANGER**

**Paperhanger**

Effective Period: 7/1/2012 - 4/30/2013

Wage Rate per Hour: **\$37.44**

Supplemental Benefit Rate per Hour: **\$29.23**

Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

Effective Period: 5/1/2013 - 6/30/2013

Wage Rate per Hour: **\$39.00**

Supplemental Benefit Rate per Hour: **\$29.23**

Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

**Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Paid Holidays**

None

**Shift Rates**

Evening shift - 4:30 P.M. to 12:00 Midnight (regular rate of pay); any work performed before 7:00 A.M. shall be at time and one half the regular base rate of pay.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

(District Council of Painters #9)

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## **PAVER AND ROADBUILDER**

### **Paver & Roadbuilder - Formsetter**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$42.86**

Supplemental Benefit Rate per Hour: **\$32.15**

### **Paver & Roadbuilder - Laborer**

Paving and road construction work, regardless of material used, including but not limited to preparation of job sites, removal of old surfaces, asphalt and/or concrete, by whatever method, including but not limited to milling; laying of concrete; laying of asphalt for temporary, patchwork, and utility paving (but not production paving); site preparation and incidental work before the installation of rubberized materials and similar surfaces; installation and repair of temporary construction fencing; slurry seal coating, maintenance of safety surfaces; play equipment installation, and other related work.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$38.99**

Supplemental Benefit Rate per Hour: **\$32.15**

### **Production Paver & Roadbuilder - Screed Person**

(Production paving is asphalt paving when using a paving machine or on a project where a paving machine is traditionally used)

Adjustment of paving machinery on production paving jobs.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$45.00**

Supplemental Benefit Rate per Hour: **\$32.15**

### **Production Paver & Roadbuilder - Raker**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$44.49**

Supplemental Benefit Rate per Hour: **\$32.15**

### **Production Paver & Roadbuilder - Shoveler**

General laborer (except removal of surfaces - see Paver and Roadbuilder-Laborer) including but not limited to tamper, AC paint and liquid tar work.

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$41.20**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: **\$32.15**

### **Overtime Description**

New Year's Day is a Paid Holiday for employees working on production paving.

If an employee works New Year's Day or Christmas Day, they receive the single time rate plus 15%, except if an employee works on production paving on New Year's Day or Christmas Day, they receive the single time rate plus one day's pay for the holiday worked.

Employees who work on a holiday listed below receive the straight time rate plus one day's pay for the holiday.

### **Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### **Paid Holidays**

Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Thanksgiving Day

### **Shift Rates**

When two shifts are employed, the work period for each shift shall be a continuous eight (8) hours. When three shifts are employed, each shift will work seven and one half (7 ½) hours but will be paid for eight (8) hours since one half (1/2) hour is allowed for meal time.

When two or more shifts are employed, single time will be paid for each shift.

**Night Work** - On night work, the first eight (8) hours of work will be paid for at fifteen percent (15%) over the single time rate, except that production paving work shall be paid at 25% over the single time rate. Hours worked over eight (8) hours during said shift shall be paid for at the time and one-half rate.

(Local #1010)

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## **PLASTERER**

### **Plasterer**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$40.78**

Supplemental Benefit Rate per Hour: **\$26.80**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$40.78**

Supplemental Benefit Rate per Hour: **\$27.55**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

When it is not possible to conduct alteration work during regular work hours, in a building occupied by tenants, said work shall proceed on a shift basis: however work over seven (7) hours in any twenty four (24) hour period, the time after seven (7) hours shall be considered overtime.

The second shift shall start at a time between 3:30 p.m. and 7:00 p.m. and shall consist of seven (7) working hours and shall receive eight (8) hours of wages and benefits at the straight time rate. The workers on the second shift shall be allowed one-half (1/2) hour to eat with this time being included in the seven (7) hours of work.

(Local #530)

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## PLASTERER - TENDER

### Plasterer - Tender

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$34.24**

Supplemental Benefit Rate per Hour: **\$24.40**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$34.50**

Supplemental Benefit Rate per Hour: **\$25.14**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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## Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

## Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

Christmas Day

## Paid Holidays

None

## Shift Rates

When work commences outside regular work hours, workers receive an hour additional (differential) wage and supplement payment. Eight hours pay for seven hours work or nine hours pay for eight hours work.

(Person Tenders District Council)

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## PLUMBER

### Plumber

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$51.76

Supplemental Benefit Rate per Hour: \$37.19

Supplemental Note: Overtime supplemental benefit rate per hour: \$74.10

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$52.36

Supplemental Benefit Rate per Hour: \$37.34

Supplemental Note: Overtime supplemental benefit rate per hour: \$74.40

### Overtime Description

Double time the regular rate after a 7 hour day - unless for new construction site work where the plumbing contract price is \$1 million or less, and for public works jobs where the plumbing contract is \$1.5 million or less, the hours of labor can be 8 hours per day at the employers option. On Alteration jobs when other mechanical

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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trades at the site are working an eighth hour at straight time, then the plumber shall also work an eighth hour at straight time.

### Overtime

Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Shift Rates

Shift work, when directly specified in public agency or authority documents where plumbing contract is \$8 million or less, will be permitted. 30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday. 50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

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## **PLUMBER (MECHANICAL EQUIPMENT AND SERVICE)** **(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$32.96**

Supplemental Benefit Rate per Hour: **\$15.93**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$33.21**

Supplemental Benefit Rate per Hour: **\$16.43**

### Overtime

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

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**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

(Plumbers Local # 1)

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**PLUMBER (RESIDENTIAL RATES FOR 1, 2 AND 3 FAMILY HOME CONSTRUCTION)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$36.69

Supplemental Benefit Rate per Hour: \$25.46

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$37.11

Supplemental Benefit Rate per Hour: \$25.56

**Overtime**

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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**Shift Rates**

30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday.  
50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

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**PLUMBER: PUMP & TANK  
(Installation and Maintenance)**

**Plumber - Pump & Tank**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$52.31

Supplemental Benefit Rate per Hour: \$31.56

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Paid Holidays**

None

**Shift Rates**

All work outside the regular workday (8:00 A.M. to 3:30 P.M.) is to be paid at time and one half the regular hourly rate

(Plumbers Local #1)

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**POINTER - WATERPROOFER, CAULKER MECHANIC (EXTERIOR BUILDING RENOVATION)**

**Pointer - Waterproofer, Caulker Mechanic**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$44.63**

Supplemental Benefit Rate per Hour: **\$23.10**

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

**Shift Rates**

All work outside the regular work day (an eight hour workday between the hours of 6:00 A.M. and 4:30 P.M.) is to be paid at time and one half the regular rate.

(Bricklayer District Council)

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**ROOFER**

**Roofer**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$38.00**

Supplemental Benefit Rate per Hour: **\$27.07**

Effective Period: 1/1/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$39.00**

Supplemental Benefit Rate per Hour: **\$27.37**

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

**Shift Rates**

Second shift - Regular hourly rate plus a 10% differential. Third shift - Regular hourly rate plus a 15% differential.

(Local #8)

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**SANDBLASTER - STEAMBLASTER  
(Exterior Building Renovation)**

**Sandblaster / Steamblaster**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$44.63**

Supplemental Benefit Rate per Hour: **\$23.10**

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

**Paid Holidays**

None

**Shift Rates**

All work outside the regular work day (an eight hour workday between the hours of 6:00 A.M. and 4:30 P.M.) is to be paid at time and one half the regular rate.

(Bricklayer District Council)

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**SHEET METAL WORKER**

**Sheet Metal Worker**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$45.65

Supplemental Benefit Rate per Hour: \$40.50

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$45.65

Supplemental Benefit Rate per Hour: \$42.00

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

**Sheet Metal Worker - Duct Cleaner**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$12.90

Supplemental Benefit Rate per Hour: \$8.07

**Sheet Metal Worker - Fan Maintenance**

(The temporary operation of fans or blowers in new or existing buildings for heating and/or ventilation, and/or air conditioning prior to the completion of the project.)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$36.52

Supplemental Benefit Rate per Hour: \$40.50

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$36.52

Supplemental Benefit Rate per Hour: \$42.00

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### Paid Holidays

None

### Shift Rates

Work that can only be performed outside regular working hours (seven hours of work between 7:30 A.M. and 3:30 P.M.) - First shift (work between 3:30 P.M. and 11:30 P.M.) - 10% differential above the established hourly rate.

Second shift (work between 11:30 P.M. and 7:30 A.M.) - 15% differential above the established hourly rate.

For Fan Maintenance: On all full shifts of fan maintenance work the straight time hourly rate of pay will be paid for each shift, including nights, Saturdays, Sundays, and holidays. No journeyman engaged in fan maintenance shall work in excess of forty (40) hours in any work week.

(Local #28)

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## SHEET METAL WORKER - SPECIALTY (Decking & Siding)

### Sheet Metal Specialty Worker

The first worker to perform this work must be paid at the rate of the Sheet Metal Worker. The second and third workers shall be paid the Specialty Worker Rate. The ratio of One Sheet Metal Worker, then Two Specialty Workers shall be utilized thereafter.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$40.09

Supplemental Benefit Rate per Hour: \$22.06

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

(Local #28)

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## SIGN ERECTOR (Sheet Metal, Plastic, Electric, and Neon)

### Sign Erector

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$41.55

Supplemental Benefit Rate per Hour: \$39.32

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$42.80

Supplemental Benefit Rate per Hour: \$42.17

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

### **Paid Holidays**

New Year's Day  
Washington's Birthday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### **Shift Rates**

Time and one half the regular hourly rate is to be paid for all hours worked outside the regular workday either (7:00 A.M. through 2:30 P.M.) or (8:00 A.M. through 3:30 P.M.)

(Local #137)

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## **STEAMFITTER**

### **Steamfitter I**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$50.75**

Supplemental Benefit Rate per Hour: **\$49.68**

Supplemental Note: Overtime supplemental benefit rate: **\$98.62**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$51.25**

Supplemental Benefit Rate per Hour: **\$50.54**

Supplemental Note: Overtime supplemental benefit rate: **\$100.34**

### **Overtime**

Double time the regular rate after a 7 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### **Paid Holidays**

None

### **Shift Rates**

Work performed between 3:30 P.M. and 7:00 A.M. and on Saturdays, Sundays and Holidays shall be at double time the regular hourly rate and paid at the overtime supplemental benefit rate above.

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### **Steamfitter II**

For heating, ventilation, air conditioning and mechanical public works contracts with a dollar value not to exceed \$15,000,000 and for fire protection/sprinkler public works contracts not to exceed \$1,500,000.

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$50.75**

Supplemental Benefit Rate per Hour: **\$49.68**

Supplemental Note: Overtime supplemental benefit rate: **\$98.62**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$51.25**

Supplemental Benefit Rate per Hour: **\$50.54**

Supplemental Note: Overtime supplemental benefit rate: **\$100.34**

### **Overtime**

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### **Paid Holidays**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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None

### Shift Rates

May be performed outside of the regular workday except Saturday, Sunday and Holidays. A shift shall consist of eight working hours. All work performed in excess of eight hours shall be paid at double time. No shift shall commence after 7:00 P.M. on Friday or 7:00 P.M. the day before holidays. All work performed after 12:01 A.M. Saturday or 12:01 A.M. the day before a Holiday will be paid at double time. When shift work is performed the wage rate for regular time worked is a thirty percent premium together with fringe benefits.

On Transit Authority projects, where work is performed in the vicinity of tracks all shift work on weekends and holidays may be performed at the regular shift rates.

Local #638

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## STEAMFITTER - REFRIGERATION AND AIR CONDITIONER (Maintenance and Installation Service Person)

### Refrigeration and Air Conditioner Mechanic

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$36.30

Supplemental Benefit Rate per Hour: \$11.76

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$37.05

Supplemental Benefit Rate per Hour: \$12.26

### Refrigeration and Air Conditioner Service Person V (4th year)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$29.82

Supplemental Benefit Rate per Hour: \$10.71

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$30.44

Supplemental Benefit Rate per Hour: \$11.13

### Refrigeration and Air Conditioner Service Person IV (3rd year)

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.71

Supplemental Benefit Rate per Hour: \$9.80

Effective Period: 1/1/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$25.22

Supplemental Benefit Rate per Hour: \$10.16

**Refrigeration and Air Conditioner Service Person III (2nd year)**

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$21.21

Supplemental Benefit Rate per Hour: \$9.12

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$21.65

Supplemental Benefit Rate per Hour: \$9.44

**Refrigeration and Air Conditioner Service Person II (2nd six months)**

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$17.60

Supplemental Benefit Rate per Hour: \$8.50

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$17.96

Supplemental Benefit Rate per Hour: \$8.78

**Refrigeration and Air Conditioner Service Person I (1st six months)**

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$10.95

Supplemental Benefit Rate per Hour: \$7.90

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$11.18

Supplemental Benefit Rate per Hour: \$8.10

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Independence Day  
Labor Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

Double time and one half the regular rate for work on the following holiday(s).

Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Columbus Day

### **Paid Holidays**

New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

(Local #638B)

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## **STONE MASON - SETTER**

### **Stone Mason - Setters**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$47.72

Supplemental Benefit Rate per Hour: \$35.28

### **Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Washington's Birthday  
Good Friday  
Memorial Day  
Independence Day  
Labor Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Thanksgiving Day  
Christmas Day

**●** **Paid Holidays**

1/2 day on Christmas Eve if work is performed in the A.M.

**Shift Rates**

For all work outside the regular workday (8:00 A.M. to 3:30 P.M. Monday through Friday), the pay shall be straight time plus a ten percent (10%) differential.

(Bricklayers District Council)

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**TAPER**

**Drywall Taper**

Effective Period: 7/1/2012 - 12/25/2012

Wage Rate per Hour: **\$43.32**

Supplemental Benefit Rate per Hour: **\$21.66**

Effective Period: 12/26/2012 - 6/30/2013

Wage Rate per Hour: **\$43.82**

**●** Supplemental Benefit Rate per Hour: **\$21.66**

**Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Shift Rates**

Time and one half the regular rate outside the regular work hours (8:00 A.M. through 3:30 P.M.)

(Local #1974)

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**TELECOMMUNICATION WORKER  
(Voice Installation Only)**

**Telecommunication Worker**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$35.94**

Supplemental Benefit Rate per Hour: **\$13.19**

Supplemental Note: The above rate applies for Manhattan, Bronx, Brooklyn, Queens. **\$12.64** for Staten Island only.

**Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Lincoln's Birthday

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Veteran's Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

New Year's Day

Lincoln's Birthday

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Veteran's Day

Thanksgiving Day

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Employees have the option of observing either Martin Luther King's Birthday or the day after Thanksgiving instead of Lincoln's Birthday

### Shift Rates

For any workday that starts before 8A.M. or ends after 6P.M. there is a 10% differential for the applicable worker's hourly rate.

### Vacation

After 6 months.....one week.  
After 12 months but less than 7 years.....two weeks.  
After 7 or more but less than 15 years.....three weeks.  
After 15 years or more but less than 25 years.....four weeks.

(C.W.A.)

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## TILE FINISHER

### Tile Finisher

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$38.17

Supplemental Benefit Rate per Hour: \$26.76

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$38.49

Supplemental Benefit Rate per Hour: \$27.42

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### Paid Holidays

None

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Shift Rates**

Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

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**TILE LAYER - SETTER**

**Tile Layer - Setter**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$47.75**

Supplemental Benefit Rate per Hour: **\$30.83**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$48.55**

Supplemental Benefit Rate per Hour: **\$31.46**

**Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Shift Rates**

Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

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## TIMBERPERSON

### Timberperson

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$42.63

Supplemental Benefit Rate per Hour: \$41.99

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

Off shift work, commencing between 5:00 P.M. and 10:00 P.M., shall work eight and one half hours but will be paid for 9 hours, including benefits at the straight time rate for 8 hours.

(Local #1536)

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## TUNNEL WORKER

### Blasters, Mucking Machine Operators (Compressed Air Rates)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$52.00

Supplemental Benefit Rate per Hour: \$46.85

### Tunnel Workers (Compressed Air Rates)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$50.19  
Supplemental Benefit Rate per Hour: \$45.29

**Top Nipper (Compressed Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$49.27  
Supplemental Benefit Rate per Hour: \$44.51

**Outside Lock Tender, Outside Gauge Tender, Muck Lock Tender (Compressed Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$48.37  
Supplemental Benefit Rate per Hour: \$43.67

**Bottom Bell & Top Bell Signal Person: Shaft Person (Compressed Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$48.37  
Supplemental Benefit Rate per Hour: \$43.67

**Changehouse Attendant: Powder Watchperson (Compressed Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$42.09  
Supplemental Benefit Rate per Hour: \$41.41

**Blasters (Free Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$49.62  
Supplemental Benefit Rate per Hour: \$44.75

**Tunnel Workers (Free Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$47.48  
Supplemental Benefit Rate per Hour: \$42.84

**All Others (Free Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$43.87  
Supplemental Benefit Rate per Hour: \$39.62

**Microtunneling (Free Air Rates)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.98

Supplemental Benefit Rate per Hour: \$34.27

**Overtime Description**

For Repair-Maintenance Work on Existing Equipment and Facilities - Time and one half the regular rate after a 7 hour day, or for Saturday, or for Sunday. Double time the regular rate for work on a holiday.

**Overtime**

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Veteran's Day

Thanksgiving Day

Christmas Day

(Local #147)

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**WELDER**

**TO BE PAID AT THE RATE OF THE JOURNEYPERSON IN THE TRADE  
PERFORMING THE WORK.**

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**OFFICE OF THE COMPTROLLER**

**CITY OF NEW YORK**

**220 APPRENTICESHIP PREVAILING WAGE SCHEDULE**

**APPENDIX**

Pursuant to Labor Law §220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant and registered with the New York State Department of Labor, may be employed on a public work project.

Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the journey person wage rate for the classification of work he actually performed.

Apprentice ratios are established to ensure the proper safety, training and supervision of apprentices. A ratio establishes the number of journey workers required for each apprentice in a program and on a job site. Ratios are interpreted as follows: in the case of a 1:1, 1:4 ratio, there must be one journey worker for the first apprentice, and four additional journey workers for each subsequent apprentice.

APPRENTICESHIP SCHEDULE OF PREVAILING WAGES AND SUPPLEMENTAL BENEFITS  
ADDENDUM  
EFFECTIVE PERIOD JANUARY 1, 2013 THROUGH JUNE 30, 2013

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List of Amended Classifications

1. Boilermaker
2. House Wrecker
3. Iron Worker - Ornamental
4. Iron Worker - Structural
5. Mason Tender
6. Plasterer
7. Plumber

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## **ASBESTOS HANDLER**

**(Ratio of Apprentice Journeyman: 1 to 1, 1 to 3)**

### **Asbestos Handler (First 1000 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 78% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$14.85

### **Asbestos Handler (Second 1000 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$14.85

### **Asbestos Handler (Third 1000 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 83% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$14.85

### **Asbestos Handler (Fourth 1000 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 89% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$14.85

(Local #78)

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## **BOILERMAKER**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

### **Boilermaker (First Year)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$27.41

Effective Period: 1/1/2013 - 3/31/2013  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$28.45

Effective Period: 4/1/2013 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyman's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate Per Hour: \$28.75

**Boilermaker (Second Year: 1st Six Months)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$28.91

Effective Period: 1/1/2013 - 3/31/2013  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.03

Effective Period: 4/1/2013 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.33

**Boilermaker (Second Year: 2nd Six Months)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 75% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.40

Effective Period: 1/1/2013 - 3/31/2013  
Wage Rate Per Hour: 75% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$31.61

Effective Period: 4/1/2013 - 6/30/2013  
Wage Rate Per Hour: 75% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$31.91

**Boilermaker (Third Year: 1st Six Months)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$31.89

Effective Period: 1/1/2013 - 3/31/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$33.19

Effective Period: 4/1/2013 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$33.49

**Boilermaker (Third Year: 2nd Six Months)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 85% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$33.38

Effective Period: 1/1/2013 - 3/31/2013  
Wage Rate Per Hour: 85% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$34.76

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 4/1/2013 - 6/30/2013  
Wage Rate Per Hour: 85% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$35.06

**Boilermaker (Fourth Year: 1st Six Months)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 90% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$34.88

Effective Period: 1/1/2013 - 3/31/2013  
Wage Rate Per Hour: 90% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$36.34

Effective Period: 4/1/2013 - 6/30/2013  
Wage Rate Per Hour: 90% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$36.64

**Boilermaker (Fourth Year: 2nd Six Months)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 95% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$36.38

Effective Period: 1/1/2013 - 3/31/2013  
Wage Rate Per Hour: 95% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$37.90

Effective Period: 4/1/2013 - 6/30/2013  
Wage Rate Per Hour: 95% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$38.20

(Local #5)

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**BRICKLAYER**  
**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

**Bricklayer (First 750 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$16.60

**Bricklayer (Second 750 Hours)**

Effective Period: 7/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Wage Rate Per Hour: 60% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

**Bricklayer (Third 750 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

**Bricklayer (Fourth 750 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

**Bricklayer (Fifth 750 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 90% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

**Bricklayer (Sixth 750 Hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 95% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

Bricklayer District Council)

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**CARPENTER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

**Carpenter (First Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 40% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$27.69

**Carpenter (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$27.69

**Carpenter (Third Year)**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$27.69

**Carpenter (Fourth Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$27.69

(Carpenters District Council)

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**CEMENT MASON**  
**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

**Cement Mason (First Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 50% of Journeyman's Rate

**Cement Mason (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 60% of Journeyman's Rate

**Cement Mason (Third Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 70% of Journeyman's Rate

(Local #780)

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**CEMENT AND CONCRETE WORKER**  
**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

**Cement & Concrete Worker (0 - 500 hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$17.54

**Cement & Concrete Worker (501 - 1000 hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$18.37

**Cement & Concrete Worker (1001 - 2000 hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$23.75

**Cement & Concrete Worker (2001 - 4000 hours)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$24.57

(Cement Concrete Workers District Council)

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**DERRICKPERSON & RIGGER (STONE)  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)**

**Derrickperson & Rigger (stone) - First Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 50% of Journeyman's rate

**Derrickperson & Rigger (stone) - Second Year: 1st Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

**Derrickperson & Rigger (stone) - Second Year: 2nd Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

**Derrickperson & Rigger (stone) - Third Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 90% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

(Local #197)

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**DOCKBUILDER/PILE DRIVER**

**(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)**

**Dockbuilder/Pile Driver (First Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$27.69

**Dockbuilder/Pile Driver (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$27.69

**Dockbuilder/Pile Driver (Third Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 65% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$27.69

**Dockbuilder/Pile Driver (Fourth Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Benefit Rate Per Hour: \$27.69

(Carpenters District Council)

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**ELECTRICIAN**

**(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)**

**Electrician (First Year - Hired before 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$14.25

Supplemental Benefit Rate per Hour: \$11.19

Overtime Wage Rate Per Hour: \$21.38

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Overtime Supplemental Rate Per Hour: \$11.96

**Electrician (First Year - Hired on or After 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$11.50  
Supplemental Benefit Rate per Hour: \$9.86  
Overtime Wage Rate Per Hour: \$17.25  
Overtime Supplemental Rate Per Hour: \$10.48

**Electrician (Second Year - Hired before 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$17.05  
Supplemental Benefit Rate per Hour: \$12.54  
Overtime Wage Rate Per Hour: \$25.58  
Overtime Supplemental Rate Per Hour: \$13.47

**Electrician (Second Year - Hired on or After 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$13.50  
Supplemental Benefit Rate per Hour: \$10.83  
Overtime Wage Rate Per Hour: \$20.25  
Overtime Supplemental Rate Per Hour: \$11.56

**Electrician (Third Year - Hired before 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$19.15  
Supplemental Benefit Rate per Hour: \$13.56  
Overtime Wage Rate Per Hour: \$28.73  
Overtime Supplemental Rate Per Hour: \$14.60

**Electrician (Third Year - Hired on or After 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$15.50  
Supplemental Benefit Rate per Hour: \$11.79  
Overtime Wage Rate Per Hour: \$23.25  
Overtime Supplemental Rate Per Hour: \$12.63

**Electrician (Fourth Year - Hired before 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$21.10  
Supplemental Benefit Rate per Hour: \$14.50  
Overtime Wage Rate Per Hour: \$31.65  
Overtime Supplemental Rate Per Hour: \$15.65

**Electrician (Fourth Year - Hired on or After 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$17.50  
Supplemental Benefit Rate per Hour: \$12.76  
Overtime Wage Rate Per Hour: \$26.25  
Overtime Supplemental Rate Per Hour: \$13.71

**Electrician (Fifth Year - Hired before 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$25.30  
Supplemental Benefit Rate per Hour: \$17.52  
Overtime Wage Rate Per Hour: \$37.95  
Overtime Supplemental Rate Per Hour: \$18.85

**Electrician (Fifth Year - Hired on or After 5/10/07)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$21.50  
Supplemental Benefit Rate per Hour: \$15.71  
Overtime Wage Rate Per Hour: \$32.25  
Overtime Supplemental Rate Per Hour: \$16.84

**Overtime Description**

For "A" rated Apprentices (work in excess of 7 hours per day)  
For "M" rated Apprentices (work in excess of 8 hours per day)

(Local #3)

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**ELEVATOR CONSTRUCTOR**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)**

**Elevator (Constructor) - First Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$25.40  
Effective 3/17/2013 - Supplemental Rate Per Hour: \$26.87

**Elevator (Constructor) - Second Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 55% of Journeyman's rate  
Supplemental Rate Per Hour: \$26.43  
Effective 3/17/2013 - Supplemental Rate Per Hour: \$27.92

**Elevator (Constructor) - Third Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Rate Per Hour: \$27.84  
Effective 3/17/2013 - Supplemental Rate Per Hour: \$29.38

**Elevator (Constructor) - Fourth Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Rate Per Hour: \$29.25  
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$30.84

(Local #1)

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**ELEVATOR REPAIR & MAINTENANCE  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)**

**Elevator Service/Modernization Mechanic (First Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$25.33  
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$26.79

**Elevator Service/Modernization Mechanic (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 55% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$25.65  
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$27.12

**Elevator Service/Modernization Mechanic (Third Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$26.92  
Effective 3/17/2013 - Supplemental Benefit Per Hour: \$28.43

**Elevator Service/Modernization Mechanic (Fourth Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$28.19

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Effective 3/17/2013 - Supplemental Benefit Per Hour: \$29.74

(Local #1)

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**ENGINEER**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 5)

**Engineer - First Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$21.64

Supplemental Benefit Rate per Hour: \$20.07

**Engineer - Second Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.05

Supplemental Benefit Rate per Hour: \$20.07

**Engineer - Third Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$29.75

Supplemental Benefit Rate per Hour: \$20.07

**Engineer - Fourth Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$32.45

Supplemental Benefit Rate per Hour: \$20.07

(Local #15)

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**ENGINEER - OPERATING**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 5)

**Operating Engineer - First Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour 40% of Journeyman's Rate

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Supplemental Benefit Per Hour: \$18.65

**Operating Engineer - Second Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's Rate  
Supplemental Benefit Per Hour: \$18.65

**Operating Engineer - Third Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 60% of Journeyman's Rate  
Supplemental Benefit Per Hour: \$18.65

(Local #14)

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**FLOOR COVERER**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

**Floor Coverer (First Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 40% of Journeyman's rate  
Supplemental Rate Per Hour: \$25.75

**Floor Coverer (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$25.75

**Floor Coverer (Third Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Rate Per Hour: \$25.75

**Floor Coverer (Fourth Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$25.75

(Carpenters District Council)

**GLAZIER**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

**Glazier (First Year)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 40% of Journeyman's rate  
Supplemental Rate Per Hour: \$11.97

**Glazier (Second Year)**

Effective Period: 7/1/2012 - 10/31/2012  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$21.01

Effective Period: 11/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$21.13

**Glazier (Third Year)**

Effective Period: 7/1/2012 - 10/31/2012  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$23.38

Effective Period: 11/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$23.54

**Glazier (Fourth Year)**

Effective Period: 7/1/2012 - 10/31/2012  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$28.14

Effective Period: 11/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$28.34

(Local #1281)

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**HEAT & FROST INSULATOR**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

**Heat & Frost Insulator (First Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

**Heat & Frost Insulator (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

**Heat & Frost Insulator (Third Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 70% of Journeyman's rate

**Heat & Frost Insulator (Fourth Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

(Local #12)

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**HOUSE WRECKER  
(TOTAL DEMOLITION)**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

**House Wrecker - First Year**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$20.06

Supplemental Benefit Rate per Hour: \$15.45

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$20.21

Supplemental Benefit Rate per Hour: \$15.80

**House Wrecker - Second Year**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$21.06

Supplemental Benefit Rate per Hour: \$15.45

Effective Period: 1/1/2013 - 6/30/2013

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Wage Rate per Hour: \$21.26  
Supplemental Benefit Rate per Hour: \$15.80

**House Wrecker - Third Year**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$22.56  
Supplemental Benefit Rate per Hour: \$15.45

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$22.81  
Supplemental Benefit Rate per Hour: \$15.80

**House Wrecker - Fourth Year**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$25.06  
Supplemental Benefit Rate per Hour: \$15.45

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$25.36  
Supplemental Benefit Rate per Hour: \$15.80

(Local #79)

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**IRON WORKER - ORNAMENTAL**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

**Iron Worker (Ornamental) - 1st Four Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$32.06

**Iron Worker (Ornamental) 5 - 10 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Rate Per Hour: \$32.89

**Iron Worker (Ornamental) 11 - 16 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.73

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Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Rate Per Hour: \$34.34

**Iron Worker (Ornamental) 17 - 22 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$35.39

**Iron Worker (Ornamental) 23 - 28 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 85% of Journeyman's rate  
Supplemental Rate Per Hour: \$36.22

**Iron Worker (Ornamental) 29 - 36 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 95% of Journeyman's rate  
Supplemental Rate Per Hour: \$37.89

**Iron Worker (Ornamental) - 1st Ten Months - Hired After 8/1/08**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$30.40

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.39

**Iron Worker (Ornamental) - 11 - 16 Months - Hired After 8/1/08**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 55% of Journeyman's rate  
Supplemental Rate Per Hour: \$31.23

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 55% of Journeyman's rate  
Supplemental Rate Per Hour: \$34.34

**Iron Worker (Ornamental) - 17 - 22 Months - Hired After 8/1/08**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$32.06

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$35.29

**Iron Worker (Ornamental) - 23 - 28 Months - Hired After 8/1/08**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.73

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Rate Per Hour: \$37.19

**Iron Worker (Ornamental) - 29 - 36 Months - Hired After 8/1/08**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$35.39

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$39.09

(Local #580)

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**IRON WORKER - STRUCTURAL  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)**

**Iron Worker (Structural) - 1st Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$23.62  
Supplemental Benefit Rate per Hour: \$41.21

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$24.10  
Supplemental Benefit Rate per Hour: \$43.12

**Iron Worker (Structural) - 7- 18 Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$24.22  
Supplemental Benefit Rate per Hour: \$41.21

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$24.70  
Supplemental Benefit Rate per Hour: \$43.12

**Iron Worker (Structural) - 19 - 36 months**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.82

Supplemental Benefit Rate per Hour: \$41.21

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$25.30

Supplemental Benefit Rate per Hour: \$43.12

(Local #40 and #361)

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**LABORER (FOUNDATION, CONCRETE, EXCAVATING, STREET PIPE LAYER & COMMON)**

**(Ratio Apprentice to Journeyperson: 1 to 1, 1 to 3)**

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - First 1000 hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.75

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Second 1000 hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 60% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.75

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Third 1000 hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 75% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.75

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Fourth 1000 hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 90% of Journeyperson's rate

Supplemental Rate Per Hour: \$31.75

(Local #731)

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**MARBLE MECHANICS**  
**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

**Cutters & Setters - First 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

**Cutters & Setters - Second 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 55% of Journeyman's rate

**Cutters & Setters - Third 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 65% of Journeyman's rate

**Cutters & Setters - Fourth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 75% of Journeyman's rate

**Cutters & Setters - Fifth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 85% of Journeyman's rate

**Cutters & Setters - Sixth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 95% of Journeyman's rate

**Polishers & Finishers - First 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

**Polishers & Finishers - Second 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

**Polishers & Finishers - Third 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

**Polishers & Finishers - Fourth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 90% of Journeyperson's rate

(Local #7)

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**MASON TENDER**  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

**Mason Tender - First Year**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$20.33  
Supplemental Benefit Rate per Hour: \$16.16

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$20.48  
Supplemental Benefit Rate per Hour: \$16.51

**Mason Tender - Second Year**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$21.33  
Supplemental Benefit Rate per Hour: \$16.16

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$21.53  
Supplemental Benefit Rate per Hour: \$16.51

**Mason Tender - Third Year**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$22.83

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Supplemental Benefit Rate per Hour: \$16.16

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$23.08

Supplemental Benefit Rate per Hour: \$16.51

**Mason Tender - Fourth Year**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$25.33

Supplemental Benefit Rate per Hour: \$16.16

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$25.63

Supplemental Benefit Rate per Hour: \$16.51

(Local #79)

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**METALLIC LATHER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

**Metallic Lather (First Year -Called Prior to 6/29/11)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.91

Supplemental Benefit Rate per Hour: \$22.79

**Metallic Lather (Second Year - Called Prior to 6/29/11)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$32.51

Supplemental Benefit Rate per Hour: \$24.44

**Metallic Lather (Third Year - Called Prior to 6/29/11)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$37.57

Supplemental Benefit Rate per Hour: \$25.59

**Metallic Lather (First Year -Called On Or After 6/29/11)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$17.71

Supplemental Benefit Rate per Hour: \$19.85

**Metallic Lather (Second Year - Called On Or After 6/29/11)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$22.71

Supplemental Benefit Rate per Hour: \$19.85

**Metallic Lather (Third Year - Called On Or After 6/29/11)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.71

Supplemental Benefit Rate per Hour: \$19.85

(Local #46)

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**MILLWRIGHT**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

**Millwright (First Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$25.40

Supplemental Benefit Rate per Hour: \$28.67

**Millwright (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$30.02

Supplemental Benefit Rate per Hour: \$31.87

**Millwright (Third Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$34.64

Supplemental Benefit Rate per Hour: \$36.19

**Millwright (Fourth Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$43.88

Supplemental Benefit Rate per Hour: \$41.50

(Local #740)

**PAVER AND ROADBUILDER**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

**Paver and Roadbuilder - First Year (Minimum 1000 hours)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$25.72**

Supplemental Benefit Rate per Hour: **\$15.75**

**Paver and Roadbuilder - Second Year (Minimum 1000 hours)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$27.29**

Supplemental Benefit Rate per Hour: **\$15.75**

(Local #1010)

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**PAINTER**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

**Painter - Brush & Roller - First Year**

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: **\$14.20**

Supplemental Benefit Rate per Hour: **\$10.88**

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: **\$14.40**

Supplemental Benefit Rate per Hour: **\$10.88**

**Painter - Brush & Roller - Second Year**

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: **\$17.75**

Supplemental Benefit Rate per Hour: **\$14.73**

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: **\$18.00**

Supplemental Benefit Rate per Hour: **\$14.73**

**Painter - Brush & Roller - Third Year**

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: \$21.30

Supplemental Benefit Rate per Hour: \$17.64

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: \$21.60

Supplemental Benefit Rate per Hour: \$17.64

**Painter - Brush & Roller - Fourth Year**

Effective Period: 7/1/2012 - 10/31/2012

Wage Rate per Hour: \$28.40

Supplemental Benefit Rate per Hour: \$23.02

Effective Period: 11/1/2012 - 6/30/2013

Wage Rate per Hour: \$28.80

Supplemental Benefit Rate per Hour: \$23.02

(District Council of Painters)

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**PAINTER - STRUCTURAL STEEL**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

**Painters - Structural Steel (First Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

**Painters - Structural Steel (Second Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

**Painters - Structural Steel (Third Year)**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

(Local #806)

## **PLASTERER**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

### **Plasterer - First Year: 1st Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 40% of Journeyman's rate  
Supplemental Rate Per Hour: \$14.61

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 40% of Journeyman's rate  
Supplemental Rate Per Hour: \$15.36

### **Plasterer - First Year: 2nd Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 45% of Journeyman's rate  
Supplemental Rate Per Hour: \$15.09

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 45% of Journeyman's rate  
Supplemental Rate Per Hour: \$15.84

### **Plasterer - Second Year: 1st Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 55% of Journeyman's rate  
Supplemental Rate Per Hour: \$17.06

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 55% of Journeyman's rate  
Supplemental Rate Per Hour: \$17.81

### **Plasterer - Second Year: 2nd Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$18.14

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$18.89

### **Plasterer - Third Year: 1st Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Rate Per Hour: \$20.31

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Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Rate Per Hour: \$21.06

**Masterer - Third Year: 2nd Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Rate Per Hour: \$21.39

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Rate Per Hour: \$22.14

(Local #530)

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**PLUMBER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

**Plumber - First Year: 1st Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$14.00  
Supplemental Benefit Rate per Hour: \$0.71

**Plumber - First Year: 2nd Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$14.00  
Supplemental Benefit Rate per Hour: \$2.96

**Plumber - Second Year**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$17.96  
Supplemental Benefit Rate per Hour: \$16.25

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$18.26  
Supplemental Benefit Rate per Hour: \$16.32

**Plumber - Third Year**

Effective Period: 7/1/2012 - 12/31/2012

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$20.06**  
Supplemental Benefit Rate per Hour: **\$16.25**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$20.36**  
Supplemental Benefit Rate per Hour: **\$16.32**

**Plumber - Fourth Year**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$22.91**  
Supplemental Benefit Rate per Hour: **\$16.25**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$23.21**  
Supplemental Benefit Rate per Hour: **\$16.32**

**Plumber - Fifth Year: 1st Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$24.31**  
Supplemental Benefit Rate per Hour: **\$16.25**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$24.61**  
Supplemental Benefit Rate per Hour: **\$16.32**

**Plumber - Fifth Year: 2nd Six Months**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$36.38**  
Supplemental Benefit Rate per Hour: **\$16.25**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$36.68**  
Supplemental Benefit Rate per Hour: **\$16.32**

(Plumbers Local #1)

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**POINTER - WATERPROOFER, CAULKER MECHANIC (EXTERIOR BUILDING  
RENOVATION)**  
**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)**

**Pointer - Waterproofer, Caulker Mechanic - First Year**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$25.00  
Supplemental Benefit Rate per Hour: \$3.45

**Pointer - Waterproofer, Caulker Mechanic - Second Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$27.25  
Supplemental Benefit Rate per Hour: \$8.40

**Pointer - Waterproofer, Caulker Mechanic - Third Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$32.23  
Supplemental Benefit Rate per Hour: \$11.15

**Pointer - Waterproofer, Caulker Mechanic - Fourth Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$38.66  
Supplemental Benefit Rate per Hour: \$11.15

(Bricklayer District Council)

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**ROOFER**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)

**Roofer - First Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 35% of Journeyman's Rate

**Roofer - Second Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 50% of Journeyman's Rate

**Roofer - Third Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 60% of Journeyman's Rate

**Roofer - Fourth Year**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 75% of Journeyman's Rate

(Local #8)

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**SHEET METAL WORKER**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

**Sheet Metal Worker - First Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 30% of Journeyman's rate

Supplemental Rate Per Hour: \$15.37

**Sheet Metal Worker - Second Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 35% of Journeyman's rate

Supplemental Rate Per Hour: \$18.24

**Sheet Metal Worker - Third Year (1st Six Months)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 40% of Journeyman's rate

Supplemental Rate Per Hour: \$20.06

**Sheet Metal Worker - Third Year (2nd Six Months)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 45% of Journeyman's rate

Supplemental Rate Per Hour: \$21.87

**Sheet Metal Worker - Fourth Year (1st Six Months)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Rate Per Hour: \$23.69

**Sheet Metal Worker - Fourth Year (2nd Six Months)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 55% of Journeyman's rate

Supplemental Rate Per Hour: \$25.33

**Sheet Metal Worker - Fifth Year (1st Six Months)**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 60% of Journeyperson's rate  
Supplemental Rate Per Hour: \$27.47

**Sheet Metal Worker - Fifth Year(2nd Six Months)**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Rate Per Hour: \$31.23

(Local #28)

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**SIGN ERECTOR**  
**(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)**

**Sign Erector - First Year: 1st Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 35% of Journeyperson's rate  
Supplemental Rate Per Hour: \$5.96

**Sign Erector - First Year: 2nd Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 40% of Journeyperson's rate  
Supplemental Rate Per Hour: \$6.75

**Sign Erector - Second Year: 1st Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 45% of Journeyperson's rate  
Supplemental Rate Per Hour: \$7.55

**Sign Erector - Second Year: 2nd Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Rate Per Hour: \$8.34

**Sign Erector - Third Year: 1st Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 55% of Journeyperson's rate  
Supplemental Rate Per Hour: \$9.13

**Sign Erector - Third Year: 2nd Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$9.92

**Sign Erector - Fourth Year: 1st Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Rate Per Hour: \$10.72

**Sign Erector - Fourth Year: 2nd Six Months**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Rate Per Hour: \$11.51

**Sign Erector - Fifth Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 75% of Journeyman's rate  
Supplemental Rate Per Hour: \$12.30

**Sign Erector - Sixth Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$12.30

(Local #137)

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**STEAMFITTER**

**(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)**

**Steamfitter - First Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate and Supplemental Per Hour: 40% of Journeyman's rate

**Steamfitter - Second Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate and Supplemental Rate Per Hour: 50% of Journeyman's rate.

**Steamfitter - Third Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate and Supplemental Rate per Hour: 65% of Journeyperson's rate.

**Steamfitter - Fourth Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate and Supplemental Rate Per Hour: 80% of Journeyperson's rate.

**Steamfitter - Fifth Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate and Supplemental Rate Per Hour: 85% of Journeyperson's rate.

(Local #638)

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**STONE MASON - SETTER**

(Ratio Apprentice of Journeyperson: 1 to 1, 1 to 2)

**Stone Mason - Setters - First 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

**Stone Mason - Setters - Second 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 60% of Journeyperson's rate

Supplemental Rate Per Hour: 50% of Journeyperson's rate

**Stone Mason - Setters - Third 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 70% of Journeyperson's rate

Supplemental Rate Per Hour: 50% of Journeyperson's rate

**Stone Mason - Setters - Fourth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: 50% of Journeyperson's rate

**Stone Mason - Setters - Fifth 750 Hours**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 90% of Journeyman's rate  
Supplemental Rate Per Hour: 50% of Journeyman's rate

**Stone Mason - Setters - Sixth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate Per Hour: 100% of Journeyman's rate  
Supplemental Rate Per Hour: 50% of Journeyman's rate

(Bricklayers District Council)

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**TAPER**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

**Drywall Taper - First Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

**Drywall Taper - Second Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

**Drywall Taper - Third Year**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 80% of Journeyman's rate

(Local #1974)

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**TILE LAYER - SETTER**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

**Tile Layer - Setter - First 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013  
Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

**Tile Layer - Setter - Second 750 Hours**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

**Tile Layer - Setter - Third 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

**Tile Layer - Setter - Fourth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

**Tile Layer - Setter - Fifth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

**Tile Layer - Setter - Sixth 750 Hours**

Effective Period: 7/1/2012 - 6/30/2013

Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

(Local #7)

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**TIMBERPERSON**

**(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)**

**Timberperson - First Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 40% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.49

**Timberperson - Second Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 50% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.49

**Timberperson - Third Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 65% of Journeyperson's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Rate Per Hour: \$27.49

**Timberperson - Fourth Year**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate Per Hour: 80% of Journeyperson's rate

Supplemental Rate Per Hour: \$27.49

(Local #1536)

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**LABOR LAW § 230 AND NYC ADMINISTRATIVE CODE § 6-130  
BUILDING SERVICE EMPLOYEES**

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**PREVAILING WAGE FOR BUILDING SERVICE EMPLOYEES ON NYC CONTRACTS PURSUANT TO  
LABOR LAW § 230 ET SEQ.**

Building service employees on public contracts must receive not less than the prevailing rate of wage and supplements for the classification of work performed. In accordance with Labor Law §230 et seq. the Comptroller of the City of New York has promulgated this schedule of prevailing wages and supplemental benefits for building service employees engaged on New York City public building service contracts in excess of \$1,500.00. Prevailing rates are required to be annexed to and form part of the contract pursuant to §231 (4).

Contracting agencies that anticipate doing work that may require building service trades or classifications not included in this schedule may request the Comptroller to establish a proper classification and wage determination for the work. Contractors using trades and/or classifications for which the Comptroller has not promulgated wages and benefits do so at their own risk.

Contractors are advised to review the applicable Comptroller's Prevailing Wage Schedule before bidding on public work. Any Prevailing Wage Rate error made by the Contracting Agency, whether in a contract document or other communication, will not preclude a finding against the contractor of a prevailing-wage violation.

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**PREVAILING WAGE FOR BUILDING SERVICE EMPLOYEES IN NEW YORK CITY LEASED OR  
FINANCIALLY ASSISTED FACILITIES PURSUANT TO NYC ADMINISTRATIVE CODE § 6-130**

Covered landlords & covered financial assistance recipients shall ensure that all building service employees performing building service work at the premises to which a lease or financial assistance pertains are paid no less than the prevailing wage listed in the Labor Law §230 Prevailing Wage Schedule.

**Covered Landlords include:**

Businesses (other than not-for-profit organizations) leasing to New York City agencies commercial office space or commercial office facilities of 10,000 square feet or more where the City leases or rents no less than 51% of the total square footage of the building to which the lease applies (no less than 80% in Staten Island or in an area not defined as an exclusion area pursuant to section 421-a of the real property tax law on the date of enactment of the local law).

**Covered Financial Assistance Recipients include:**

Businesses (other than not-for-profit organizations) with annual gross revenues of five million dollars or more who have received financial assistance from the City of New York (as defined in New York City Administrative Code §6-130) with a total value of one million dollars or more.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Exemptions: Business Improvement Districts and employers with manufacturing operations at the premises to which the financial assistance pertains.**

The information is intended to assist you in meeting your prevailing wage obligation. You should consult New York City Administrative Code §6-130 to determine whether you are covered by this prevailing wage law. New York City Administrative Code § 6-130 requires the City to maintain an updated list of covered landlords and financial assistance recipients who are subject to the prevailing wage requirement.

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Labor Law § 231 (6) and NYC Administrative Law §6-130 require contractors to post on the site of the work a current copy of this schedule of wages and supplements.

This schedule is applicable to work performed during the effective period, unless otherwise noted. Changes to this schedule are published on our web site [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov). Contractors must pay the wages and supplements in effect when the building service employee performs the work. Preliminary schedules for future one-year periods appear in the City Record on or about June 1 each succeeding year. Final schedules appear on or about July 1 in the City Record and on our web site [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov).

Contractors are solely responsible for maintaining original payroll records delineating, among other things, the hours worked by each employee within a given classification.

Some of the rates in this schedule are based on collective bargaining agreements. The Comptroller's Office has attempted to include all overtime, shift and night differential, Holiday, Saturday, Sunday or other premium time work. However, this schedule does not set forth every prevailing practice with respect to such rates with which employers must comply. All such practices are nevertheless part of the employer's prevailing wage obligation and contained in the collective bargaining agreements of the prevailing wage unions. These collective bargaining agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classification Unit by calling (212) 669-7974. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasyl Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

- 1) Provide bona-fide benefits which cost the employer no less than the prevailing supplemental benefits rate; or
- 2) Supplement the employee's hourly wage by an amount no less than the prevailing supplemental benefits rate; or
- 3) Provide a combination of bona-fide benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.

**Benefits are paid for EACH HOUR WORKED unless otherwise noted.**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE



Office of the Comptroller  
BUREAU OF LABOR LAW

CITY OF NEW YORK  
OFFICE OF THE COMPTROLLER  
JOHN C. LIU

BUREAU OF LABOR LAW

MUNICIPAL BUILDING  
ONE CENTRE STREET, ROOM 1120  
NEW YORK, N.Y. 10007-2341

TEL: (212) 669-4443  
FAX: (212) 669-4002

If you are a Covered Building Service Employee and you have been paid less than the Prevailing Wage and Benefits, please contact us at 212-669-4443 or download our complaint form from our website at [WWW.COMPTROLLER.NYC.GOV](http://WWW.COMPTROLLER.NYC.GOV) (click on the Bureau of Labor Law).

Si es un empleado de servicios a edificios elegible y recibió menos del sueldo prevalente y beneficios, por favor contáctenos en 212-669-4443 o descarga un formulario de reclamo del sitio del Internet [WWW.COMPTROLLER.NYC.GOV](http://WWW.COMPTROLLER.NYC.GOV) (oprime "Oficina de Derecho Laboral").

Wasył Kinach, P.E.  
Director of Classifications  
Bureau of Labor Law

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

§230 SCHEDULE OF PREVAILING WAGES AND SUPPLEMENTAL BENEFITS ADDENDUM  
EFFECTIVE PERIOD JANUARY 1, 2013 THROUGH JUNE 30, 2013

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List of Amended Changes

1. MODIFIED PREAMBLE TO INCORPORATE PROVISIONS OF NYC ADMINISTRATIVE CODE §6-130

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## **BOILER SERVICEPERSON/TANK CLEANER MECHANIC (LOW PRESSURE)**

### **Boiler Service Person/Tank Cleaner Mechanic (Low Pressure)**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$11.37

Supplemental Benefit Rate per Hour: \$5.57

### **Overtime Description**

Work in excess of 8 hours performed on a Sunday or Holiday shall be paid two and one half times the regular rate.

### **Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

### **Paid Holidays**

New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day  
Employee's Birthday

### **Vacation**

1 year service.....five (5) days  
3 years service or more.....ten (10) days  
8 years service or more.....fifteen (15) days  
13 years service or more.....twenty (20) days

### **SICK LEAVE:**

1-2 years employment.....4 days  
2-3 years employment.....5 days  
3-4 years employment.....6 days  
4-5 years employment.....8 days  
6 years or more employment.....10 days

(Local #32 B/J)

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## **BUILDING CLEANER AND MAINTAINER (OFFICE)**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Office Building Class "A" Handyperson (Over 280,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.77

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$25.10

Supplemental Benefit Rate per Hour: \$9.51

**Office Building Class "A" Foreperson, Starter (Over 280,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.66

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$24.99

Supplemental Benefit Rate per Hour: \$9.51

**Office Building Class "A" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 280,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$22.65

Supplemental Benefit Rate per Hour: \$9.13

Supplemental Note: for new employee 0-12 months of employment - \$6.64; for new employee 13-24 months of employment - \$8.81

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$22.97

Supplemental Benefit Rate per Hour: \$9.51

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

**NEW HIRE:** Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

**Office Building Class "B" Handyperson (Over 120,000 and less than 280,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$24.74

Supplemental Benefit Rate per Hour: \$9.13

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$25.07  
Supplemental Benefit Rate per Hour: \$9.51

**Office Building Class "B" Foreperson, Starter (Over 120,000 and less than 280,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$24.63  
Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$24.95  
Supplemental Benefit Rate per Hour: \$9.51

**Office Building Class "B" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 120,000 and less than 280,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$22.62  
Supplemental Benefit Rate per Hour: \$9.13  
Supplemental Note: for new employee 0-12 months of employment - \$6.64; for new employee 13-24 months of employment - \$8.81

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$22.94  
Supplemental Benefit Rate per Hour: \$9.51  
Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

**Office Building Class "C" Handyperson (Less than 120,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: \$24.70  
Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: \$25.02  
Supplemental Benefit Rate per Hour: \$9.51

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Office Building Class "C" Foreperson, Starter (Less than 120,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$24.59**

Supplemental Benefit Rate per Hour: **\$9.13**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$24.91**

Supplemental Benefit Rate per Hour: **\$9.51**

**Office Building Class "C" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Less than 120,000 square feet gross area)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$22.57**

Supplemental Benefit Rate per Hour: **\$9.13**

Supplemental Note: for new employee 0-12 months of employment - \$6.64; for new employee 13-24 months of employment - \$8.81

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$22.90**

Supplemental Benefit Rate per Hour: **\$9.51**

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

**NEW HIRE:** Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for work on a holiday plus the day's pay.

Time and one half the regular hourly rate after 40 hours in any work week.

**Paid Holidays**

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Vacation**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Less than 6 months of work.....no vacation  
6 months of work.....three (3) days  
1 year of work.....ten (10) days  
5 years of work.....fifteen (15) days  
15 years of work.....twenty (20) days  
21 years of work.....twenty-one (21) days  
22 years of work.....twenty-two (22) days  
23 years of work.....twenty-three (23) days  
24 years of work.....twenty-four (24) days  
25 years or more of work.....twenty-five (25) days  
Plus two Personal Days per year.

**Sick Leave:**

10 sick days per year.

Unused sick leave paid in the succeeding January, one full day pay for each unused sick day.

(Local #32 B/J)

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## **BUILDING CLEANER AND MAINTAINER (RESIDENTIAL)**

### **Residential Building Class "A" Handyperson**

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2012 – 4/20/2013

Wage Rate per Hour: **\$22.94**

Supplemental Benefit Rate per Hour: **\$8.68**

Supplemental Note: Effective 1/1/2013 - \$9.43

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: **\$23.57**

Supplemental Benefit Rate per Hour: **\$9.43**

### **Residential Building Class "A" Cleaner/Porter**

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: **\$20.77**

Supplemental Benefit Rate per Hour: **\$8.68**

Supplemental Note: for new employee 0-12 months of employment - \$6.37; for new employee 13-24 months of employment - \$8.43

Effective 1/1/2013 - \$9.43; for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

Effective Period: 4/21/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$21.34

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

### Residential Building Class "B" Handyperson

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: \$22.88

Supplemental Benefit Rate per Hour: \$8.68

Supplemental Note: Effective 1/1/2013 - \$9.43

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: \$23.51

Supplemental Benefit Rate per Hour: \$9.43

### Residential Building Class "B" Cleaner/Porter

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2012 - 4/20/2013

Wage Rate per Hour: \$20.71

Supplemental Benefit Rate per Hour: \$8.68

Supplemental Note: for new employee 0-12 months of employment - \$6.37; for new employee 13-24 months of employment - \$8.43

Effective 1/1/2013 - \$9.43; for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

Effective Period: 4/21/2013 - 6/30/2013

Wage Rate per Hour: \$21.28

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

### Residential Building Class "C" Handyperson

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Residential Building Class "C":** buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

**Effective Period:** 7/1/2012 - 4/20/2013

**Wage Rate per Hour:** \$22.83

**Supplemental Benefit Rate per Hour:** \$8.68

**Supplemental Note:** Effective 1/1/2013 - \$9.43

**Effective Period:** 4/21/2013 - 6/30/2013

**Wage Rate per Hour:** \$23.45

**Supplemental Benefit Rate per Hour:** \$9.43

**Residential Building Class "C" Cleaner/Porter**

**Residential Building Class "C":** buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

**Effective Period:** 7/1/2012 - 4/20/2013

**Wage Rate per Hour:** \$20.65

**Supplemental Benefit Rate per Hour:** \$8.68

**Supplemental Note:** for new employee 0-12 months of employment - \$6.37; for new employee 13-24 months of employment - \$8.43

**Effective 1/1/2013 - \$9.43; for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18**

**Effective Period:** 4/21/2013 - 6/30/2013

**Wage Rate per Hour:** \$21.23

**Supplemental Benefit Rate per Hour:** \$9.43

**Supplemental Note:** for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

**NEW HIRE:** Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for work on a holiday plus the day's pay.

Time and one half the regular hourly rate after 40 hours in any work week.

**Paid Holidays**

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Christmas Day

**Vacation**

3 months.....three (3) days  
1 year.....ten (10) days  
5 years.....fifteen (15) days  
15 years.....twenty (20) days  
21 years.....twenty-one (21) days  
22 years.....twenty-two (22) days  
23 years.....twenty-three (23) days  
24 years.....twenty-four (24) days  
25 years.....twenty-five (25) days  
Plus two Personal Days per year.

**SICK LEAVE**

After 1 year of service.....ten (10) days per year

(Local #32 B/J)

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**BUILDING HVAC SERVICES OPERATOR**

**Engineer (Refrigeration)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$34.15**

Supplemental Benefit Rate per Hour: **\$15.44**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$35.18**

Supplemental Benefit Rate per Hour: **\$15.78**

**Fireperson**

Fireperson (Helper): Assists the Engineer

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$26.59**

Supplemental Benefit Rate per Hour: **\$15.09**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$27.39**

Supplemental Benefit Rate per Hour: **\$15.41**

**Overtime Description**

All hours worked on a holiday shall be paid at two and one half times the regular wage rate in lieu of the paid day off.

**Overtime**

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

**Paid Holidays**

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day  
Plus six (6) floating Holidays

**Vacation**

6 months ..... three (3) days  
1 year ..... ten (10) days  
5 years ..... fifteen (15) days  
15 years ..... twenty (20) days  
21 years..... twenty-one (21) days  
22 years ..... twenty-two (22) days  
23 years ..... twenty-three (23) days  
24 years ..... twenty-four (24) days  
25 years ..... twenty-five (25) days

(Local #94)

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**CLEANER (PARKING GARAGE)**

**Garage Cleaner**

Effective Period: 7/1/2012 - 6/30/2013  
Wage Rate per Hour: \$10.00  
Supplemental Benefit Rate per Hour: \$1.50

**Overtime**

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(NYC Administrative Code §6-109)

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**FUEL OIL**

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (5th Year and above)**

Effective Period: 7/1/2012 - 12/15/2012  
Wage Rate per Hour: \$30.11  
Supplemental Benefit Rate per Hour: \$18.80

Effective Period: 12/16/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$30.61**  
Supplemental Benefit Rate per Hour: **\$19.80**  
Supplemental Note: Effective 1/1/2013 - **\$20.42**

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (4th Year)**

Effective Period: 7/1/2012 - 12/15/2012  
Wage Rate per Hour: **\$27.50**  
Supplemental Benefit Rate per Hour: **\$18.80**

Effective Period: 12/16/2012 - 6/30/2013  
Wage Rate per Hour: **\$28.00**  
Supplemental Benefit Rate per Hour: **\$19.80**  
Supplemental Note: Effective 1/1/2013 - **\$20.42**

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (3rd Year)**

Effective Period: 7/1/2012 - 12/15/2012  
Wage Rate per Hour: **\$25.50**  
Supplemental Benefit Rate per Hour: **\$18.80**

Effective Period: 12/16/2012 - 6/30/2013  
Wage Rate per Hour: **\$26.00**  
Supplemental Benefit Rate per Hour: **\$19.80**  
Supplemental Note: Effective 1/1/2013 - **\$20.42**

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (2nd Year)**

Effective Period: 7/1/2012 - 12/15/2012  
Wage Rate per Hour: **\$23.50**  
Supplemental Benefit Rate per Hour: **\$18.80**

Effective Period: 12/16/2012 - 6/30/2013  
Wage Rate per Hour: **\$24.00**  
Supplemental Benefit Rate per Hour: **\$19.80**  
Supplemental Note: Effective 1/1/2013 - **\$20.42**

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (1st Year)**

Effective Period: 7/1/2012 - 12/15/2012  
Wage Rate per Hour: **\$21.50**  
Supplemental Benefit Rate per Hour: **\$18.80**

Effective Period: 12/16/2012 - 6/30/2013  
Wage Rate per Hour: **\$22.00**  
Supplemental Benefit Rate per Hour: **\$19.80**  
Supplemental Note: Effective 1/1/2013 - **\$20.42**

**Overtime**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

- Martin Luther King Jr. Day
- Lincoln's Birthday
- Washington's Birthday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Election Day
- Veteran's Day

Triple time the regular rate for work on the following holiday(s).

- New Year's Day
- Thanksgiving Day
- Christmas Day

**Paid Holidays**

- New Year's Day
- Martin Luther King Jr. Day
- Lincoln's Birthday
- Washington's Birthday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Election Day
- Veteran's Day
- Thanksgiving Day
- Christmas Day

**Vacation**

Less than 75 days worked.....no vacation.  
75 days worked, but less than 110 days worked in a calendar year.....five (5) days the following year.  
110 days or more worked in a calendar year.....ten (10) days the following year.

**SICK LEAVE:**

1 day sick leave earned for each 40 days worked in the preceding calendar year for a maximum of five (5) days per calendar year.

(Local #553)

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**GARDENER**

**Gardener**

Effective Period: 7/1/2012 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$17.04**

Supplemental Benefit Rate per Hour: **\$1.72**

**Overtime**

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

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**LOCKSMITH**

**Locksmith**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$21.46**

Supplemental Benefit Rate per Hour: **\$5.89**

**Overtime**

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

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**MEDICAL WASTE REMOVAL**

**Driver**

Effective Period: 7/1/2012 - 3/31/2013

Wage Rate per Hour: **\$17.75**

Supplemental Benefit Rate per Hour: **\$8.79**

Effective Period: 4/1/2013 - 6/30/2013

Wage Rate per Hour: **\$18.00**

Supplemental Benefit Rate per Hour: **\$9.34**

**Helper**

Effective Period: 7/1/2012 - 3/31/2013

Wage Rate per Hour: **\$14.00**

Supplemental Benefit Rate per Hour: **\$8.79**

Effective Period: 4/1/2013 - 6/30/2013

Wage Rate per Hour: **\$14.25**

Supplemental Benefit Rate per Hour: **\$9.34**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Tractor Trailer Driver**

Effective Period: 7/1/2012 - 3/31/2013

Wage Rate per Hour: **\$20.25**

Supplemental Benefit Rate per Hour: **\$8.79**

Effective Period: 4/1/2013 - 6/30/2013

Wage Rate per Hour: **\$20.50**

Supplemental Benefit Rate per Hour: **\$9.34**

**Overtime Description**

Time and one half the regular hourly rate after an 8 hour day or after 40 hours in any work week. The seventh day of work in a workweek is paid at double time the regular hourly rate. Time and one half the regular hourly rate for work on a holiday plus days pay for below paid holidays.

**Paid Holidays**

- Presidents' Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Christmas Day

**Vacation**

1 year of service but less than five years.....	10 days
5 years of service but less than ten years.....	15 days
10 years of service.....	16 days
11 years.....	17 days
12 years.....	18 days
13 years.....	19 days
14 years.....	20 days
20 years.....	21 days
21 years.....	22 days
22 years.....	23 days
23 years.....	24 days
24 years.....	25 days
Plus 5 Personal Days	

(Local #813)

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**MOVER – OFFICE FURNITURE AND EQUIPMENT**

**Heavy and Tractor Trailer Truck Driver**

Tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW)

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: **\$23.11**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$4.10

**Light Truck Driver**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$18.08

Supplemental Benefit Rate per Hour: \$4.10

**Laborer and Freight, Stock, and Material Movers, Hand**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$17.68

Supplemental Benefit Rate per Hour: \$4.10

**Overtime**

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

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**REFUSE REMOVER**

**Refuse Remover**

Effective Period: 7/1/2012 - 6/30/2013

Wage Rate per Hour: \$27.62

Supplemental Benefit Rate per Hour: \$4.10

**Overtime**

Time and one half the regular rate after an 8 hour day or after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

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**SECURITY GUARD (ARMED)**

**Security Guard (Armed)**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$27.75

Supplemental Benefit Rate per Hour: \$4.73

Supplemental Note: for new employee 0-30 days of employment - \$4.09; for new employee 31-120 days of employment - \$4.26; for new employee 121 days - 2 years of employment - \$4.37

Effective Period: 1/1/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$28.00**

Supplemental Benefit Rate per Hour: **\$4.90**

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43; for new employee 121 days - 2 years of employment - \$4.54

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

### Overtime Description

A guard who works a holiday is paid the regular rate plus receives the paid holiday.

Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

### Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Vacation

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

### Sick Leave

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

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## SECURITY GUARD (UNARMED)

### Security Guard (Unarmed) 0 - 6 months

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$12.60**

Supplemental Benefit Rate per Hour: **\$4.37**

Supplemental Note: for new employee 0-30 days of employment - \$4.09; for new employee 31-120 days of employment - \$4.26

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$230 PREVAILING WAGE SCHEDULE

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$12.85

Supplemental Benefit Rate per Hour: \$4.54

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43

**Security Guard (Unarmed) 7 - 12 months**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$13.10

Supplemental Benefit Rate per Hour: \$4.37

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$13.35

Supplemental Benefit Rate per Hour: \$4.54

**Security Guard (Unarmed) 13 - 18 months**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$13.60

Supplemental Benefit Rate per Hour: \$4.37

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$13.85

Supplemental Benefit Rate per Hour: \$4.54

**Security Guard (Unarmed) 19 - 24 months**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$14.10

Supplemental Benefit Rate per Hour: \$4.37

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$14.35

Supplemental Benefit Rate per Hour: \$4.54

**Security Guard (Unarmed) 25 - 30 months**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$14.60

Supplemental Benefit Rate per Hour: \$4.73

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$14.85

Supplemental Benefit Rate per Hour: \$4.90

**Security Guard (Unarmed) 31 months or more**

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$14.75

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$4.73

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: \$15.15

Supplemental Benefit Rate per Hour: \$4.90

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

### Overtime Description

A guard who works a holiday is paid the regular rate plus receives the paid holiday.

Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

### Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Vacation

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

### Sick Leave

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

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## WINDOW CLEANER

### Window Cleaner

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: \$26.12

Supplemental Benefit Rate per Hour: \$9.13

Effective Period: 1/1/2013 - 6/30/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: **\$26.44**  
Supplemental Benefit Rate per Hour: **\$9.51**

**Power Operated Scaffolds, Manual Scaffolds, and Boatswain Chairs**

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$28.37**  
Supplemental Benefit Rate per Hour: **\$9.13**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$28.69**  
Supplemental Benefit Rate per Hour: **\$9.51**

**Window Cleaner Apprentice (0 - 3 months)**

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$19.35**  
Supplemental Benefit Rate per Hour: **\$0.00**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$19.59**  
Supplemental Benefit Rate per Hour: **\$0.00**

**Window Cleaner Apprentice (4 - 7 months)**

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$20.92**  
Supplemental Benefit Rate per Hour: **\$9.13**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$21.18**  
Supplemental Benefit Rate per Hour: **\$9.51**

**Window Cleaner Apprentice (8 - 11 months)**

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012  
Wage Rate per Hour: **\$22.17**  
Supplemental Benefit Rate per Hour: **\$9.13**

Effective Period: 1/1/2013 - 6/30/2013  
Wage Rate per Hour: **\$22.44**  
Supplemental Benefit Rate per Hour: **\$9.51**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$230 PREVAILING WAGE SCHEDULE

**Window Cleaner Apprentice (12 - 15 months)**

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$23.43**

Supplemental Benefit Rate per Hour: **\$9.13**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$23.72**

Supplemental Benefit Rate per Hour: **\$9.51**

**Window Cleaner Apprentice (16 - 17 months)**

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2012 - 12/31/2012

Wage Rate per Hour: **\$24.70**

Supplemental Benefit Rate per Hour: **\$9.13**

Effective Period: 1/1/2013 - 6/30/2013

Wage Rate per Hour: **\$25.01**

Supplemental Benefit Rate per Hour: **\$9.51**

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

**Paid Holidays**

New Year's Day

Martin Luther King Jr. Day

President's Birthday

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Personal Day

**Vacation**

After 7 months but less than 1 year of service.....5 days

1 year but less than 5 years of service.....10 days

5 years of service but less than 15 years of service.....15 days

15 years of service but less than 21 years of service.....20 days

21 years.....21 days

22 years.....22 days

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

23 years.....23 days  
24 years.....24 days  
25 years or more of service.....25 days  
1 day per year for medical visit

**SICK LEAVE:**  
10 days after one year worked. Unused sick days to be paid in cash.

(Local #32 B/J)

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# **SECTION 01000**

# **GENERAL CONDITIONS**

**APPLICABLE TO ALL CONTRACTS**

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The ADDENDUM TO THE GENERAL CONDITIONS is contained in Volume 3 of the Contract Documents. Volume 3 contains the following:

- Addendum to the General Conditions
- Specifications

## SECTION 01000 GENERAL CONDITIONS

### PART 1 - GENERAL

#### 1.01 Applicability of General Conditions

- A. Since there are several separate Contracts pertaining to the construction of this project, for convenience, the General Conditions are stated only once. These General Conditions are applicable to all Contracts and shall constitute an integral part of each separate Contract to the same extent as though they were repeated in full therein.
- B. The Contractor is advised that various sections of these General Conditions are amended by the Addendum to the General Conditions. This Addendum also includes various schedules referred to in these General Conditions (Schedules A through F). These schedules contain important information that is specific to this project. The Addendum, including Schedules A through F, is set forth in Volume 3 of the Contract Documents.
- C. Throughout these General Conditions, various responsibilities and obligations are assigned to each of the following four Contractors: (1) General Construction, (2) Plumbing, (3) Heating/Ventilating/Air-Conditioning/Fire Protection, and (4) Electrical. In the event the Project does not involve all four Contracts, the responsibilities and obligations of each omitted Contract shall be assigned to one of the Contracts which is included in the Project. The Addendum to the General Conditions specifies which Contractor shall perform the responsibilities and obligations of each omitted contract, as set forth in the General Conditions.

#### 1.02 Scope and Intent

- A. DESCRIPTION OF PROJECT - Refer to the Addendum to the General Conditions for a description of this project.
- B. PROGRESS SCHEDULE
  1. Within 15 days after the Notice to Proceed, the Contractor for General Construction Work shall prepare a composite Job Progress Chart that shall indicate graphically and chronologically the time the various parts of the work of all Contracts shall commence and be completed. The Chart shall be in a reproducible form approved by the Commissioner.
  2. Immediately after the Notice to Proceed of their Contracts, the Contractors for Plumbing Work, Heating, Ventilating and Air Conditioning Work (HVAC) and Electrical Work, as applicable, shall furnish all necessary data to the Contractor for General Construction Work, and cooperate in all respects in connection with formulation of the Chart.
  3. The Chart shall show the sequence and interrelationship of each operation of all the Contracts.
  4. The Chart shall show the estimated time for fabrication and/or delivery of all materials and equipment required for the work.
  5. As directed by the Resident Engineer, the Contractors shall meet with each other and with the Resident Engineer to review and make the necessary adjustments to the composite Job Progress Chart, and to coordinate the work indicated thereon. (Article 12 of the Contract).
  6. When completed, the Job Progress Chart shall be signed and dated by each Contractor or their official representative. The Resident Engineer is authorized to sign the Chart for the Department of Design and Construction. Thereafter, the Chart shall be modified only with the Commissioner's approval. When directed by the Commissioner, the Chart shall be revised and updated. If necessary, a new revised Chart shall be prepared in the same manner as outlined above for the original Chart.

7. The approved Chart shall be distributed by the Contractor for General Construction Work, as follows: the original and two (2) copies to the Resident Engineer, two (2) copies to each Contractor, and two (2) copies to the Department of Design and Construction
  8. All Contractors shall consult the approved Progress Chart and install their work within the time limits indicated on the Chart.
  9. The Resident Engineer shall post in a prominent place in the field office a copy of the Chart and mark thereon the progress of the work, including the times when various parts of the work commenced and were completed.
- C. **COMPLETION OF WORK** - Work to be done under each separate Contract comprises the furnishing of all labor, materials, equipment and other appurtenances and obtaining of all regulatory agency approvals necessary and required to complete the construction work in accordance with the Contract.
  - D. **OMISSION OF DETAILS** - All work called for in the Specifications applicable to each separate Contract but not shown on the Contract Drawings in their present form, or vice versa, is required, and shall be performed by the Contractor as though it were originally delineated or described. Such work is deemed included in the Bid Price.
  - E. **WORK NOT IN SPECIFICATIONS OR CONTRACT DRAWINGS** - Work not particularly specified in the Specifications nor detailed on the Contract Drawings but involved in carrying out their intent or in the complete and proper execution of the work, is required, and shall be performed by the Contractor. Such work is deemed included in the Bid Price.
  - F. **SILENCE OF THE SPECIFICATIONS** - The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best practice is to prevail and that only the best material and workmanship is to be used and interpretation of the Specifications shall be made upon that basis.
  - G. **CONFLICT BETWEEN CONTRACT DRAWINGS AND SPECIFICATIONS** - Should any conflict occur in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated on the most expensive way of doing the work unless the Contractor shall have asked for and obtained a decision in writing from the Commissioner before the submission of the bid as to what shall govern.
  - H. **COOPERATION BETWEEN CONTRACTORS** - Inasmuch as the completion of the project within the prescribed limit of time is dependent largely upon the close and active cooperation of all those engaged therein, it is therefore expressly understood and agreed that the Contractor shall lay out and install all work at such time or times and in such manner as not to delay or interfere with the carrying forward of the work of other Contractors. In the event of any dispute arising as to possible or alleged interference between the various Contractors which may retard the progress of the work, the dispute shall be adjudicated by the Commissioner, whose decision as to the party or parties at fault and as to the manner in which the matter may be adjudicated, shall be binding and conclusive on all parties.
  - I. **"DIRECTED," "REQUIRED," ETC.** - Wherever reference is made in the Contract to the work or its performance, the terms "directed," "required," "permitted," "ordered," "designated," "prescribed," "determined," and words of similar import shall, unless expressed otherwise, imply the direction, requirements, permission, order, designation or prescription of the Commissioner.
  - J. **"APPROVED," ETC.** - "Approved," "acceptable," "satisfactory," and words of similar import shall mean and intend approved, acceptable or satisfactory to the Commissioner.
  - K. **CONFLICTS OF INTERESTS** - The Charter of the City of New York, Section 2604, provides a number of safeguards in relation to conflicts of interest. Such safeguards include, without limitation, the following: "No public servant shall receive compensation except from the City for performing any official duty or accept or receive any gratuity from any person whose interest may be affected by the

public servant's official action."

1. Other sections of the City Charter, the Administrative Code and the Penal Law are applicable in implementing the basic Conflicts of Interest Section and under certain circumstances penalties may be invoked against the donor as well as the recipient of any form of valuable gift.
2. Notice is hereby given that sections of the City Charter, the Administrative Code and the Penal Law alluded to herein shall apply under the terms of this Contract to circumstances relevant to conflicts of interest and shall be extended in application to subcontractors authorized to perform work, labor and services pursuant to this Contract and further, it shall be the duty and responsibility of the Contractors to so inform their respective subcontractors.

### 1.03 Provisions Referenced in the Contract

- A. Various Articles of the Contract refer to requirements set forth in Schedule A of the General Conditions. Schedule A, which is included in the Addendum to the General Conditions, sets forth 1) the referenced Articles of the Contract, and 2) the specific requirements applicable to each respective Contract.
- B. Applications for Extensions of Time, as indicated in Article 13 of the Contract, shall be made in accordance with the Rules of the Procurement Policy Board.
- C. **PARTIAL PAYMENTS FOR MATERIALS IN ADVANCE OF THEIR INCORPORATION IN THE WORK PURSUANT TO ARTICLE 42 OF THE "CONTRACT"** - In order to better insure the availability of materials, fixtures and equipment when needed for the work, the Commissioner may authorize partial payment for certain materials, fixtures and equipment, prior to their incorporation in the work, but only in strict accordance with, and subject to, all the terms and conditions set forth in the Specifications, unless an alternate method of payment is elsewhere provided in the Specifications for specified materials, fixtures or equipment.
  1. The Contractor shall submit to the Commissioner a written request, in quadruplicate, for payment for materials purchased or to be purchased for which the Contractor needs to be paid prior to their actual incorporation in the work. The request shall be accompanied by a schedule of the types and quantities of materials, and shall state whether such materials are to be stored on or off the site.
  2. Where the materials are to be stored off the site, they shall be stored at a place other than the Contractor's premises (except with the written consent of the Commissioner) and under the conditions prescribed or approved by the Commissioner. The Contractor shall set apart and separately store at the place or places of storage all materials and shall clearly mark same "PROPERTY OF THE CITY OF NEW YORK", and further, shall not at any time move any of said materials to another off-site place of storage without the prior written consent of the Commissioner. Materials may be removed from their place of storage off the site for incorporation in the work upon approval of the Resident Engineer.
  3. Where the materials are to be stored at the site, they shall be stored at such locations as shall be designated by the Resident Engineer and only in such quantities as, in the opinion of the Resident Engineer, will not interfere with the proper performance of the work by the Contractor or by other Contractors then engaged in performing work on the site. Such materials shall not be removed from their place of storage on the site except for incorporation in the work, without the approval of the Resident Engineer.
4. **INSURANCE**
  - a. **STORAGE OFF-SITE** - Where the materials are stored off the site and until such time as they are incorporated in the work, the Contractor shall fully insure such materials against any and all risks of destruction, damage or loss including but not limited to fire, theft, and any other casualty or happening. The policy of insurance shall be payable to the City of New York. It shall be in such terms and amounts as shall be approved by the Commissioner and shall be

placed with a company duly licensed to do business in the State of New York. The Contractor shall deliver the original and one (1) copy of such policy or policies marked "Fully Paid" to the Commissioner.

- b. STORAGE ON THE SITE - Where the materials are stored at the site, the Contractor shall furnish satisfactory evidence to the Commissioner that they are properly insured against loss, by endorsements or otherwise, under the policy or policies of insurance obtained by the Contractor to cover losses to materials owned or installed by the Contractor. The policy of insurance shall cover fire and extended coverage against windstorm, hail, explosion and riot attending a strike, civil commotion, aircraft, vehicles and smoke.
5. All costs, charges and expenses arising out of the storage of such materials, shall be paid by the Contractor and the City hereby reserves the right to retain out of any partial or final payment made under the Contract an amount sufficient to cover such costs, charges and expenses with the understanding that the City shall have and may exercise any and all other remedies at law for the recovery of such cost, charges and expenses. There shall be no increase in the Contract price for such costs, charges and expenses and the Contractor shall not make any claim or demand for compensation therefor.
6. The Contractor shall pay any and all costs of handling and delivery of materials, to the place of storage and from the place of storage to the site of the work; and the City shall have the right to retain from any partial or final payment an amount sufficient to cover the cost of such handling and delivery.
7. In the event that the whole or any part of these materials are lost, damaged or destroyed in advance of their satisfactory incorporation in the work, the Contractor, at the Contractor's own cost, shall replace such lost, damaged or destroyed materials of the same character and quality. The City will reimburse the Contractor for the cost of the replaced materials to the extent, and only to the extent, of the funds actually received by the City under the policies of insurance hereinbefore referred to. Until such time as the materials are replaced, the City will deduct from the value of the stored materials or from any other money due under the Contract, the amount paid to the Contractor for such lost, damaged or destroyed materials.
8. Should any of the materials paid for the City hereunder be subsequently rejected or incorporated in the work in a manner or by a method not in accordance with the Contract and Specifications, the Contractor shall remove and replace, at Contractor's own cost, such defective or improperly incorporated material with materials complying with the Contract and Specifications. Until such materials are replaced, the City will deduct from the value of the stored materials or from any other money due the Contractor, the amount paid by the City for such rejected or improperly incorporated materials.
9. Payments for the cost of materials made hereunder shall not be deemed to be an acceptance of such materials as being in accordance with the Contract Documents, and the Contractor always retains and must comply with the Contractor's duty to deliver to the site and properly incorporate in the work only materials which comply with the Contract Documents.
10. The Contractor shall retain any and all risks in connection with the damage, destruction or loss of the materials paid for hereunder to the time of delivery of the same to the site of the work and their proper incorporation in the work in accordance with the Contract Documents.
11. The Contractor shall comply with all laws and the regulations of any governmental body or agency pertaining to the priority purchase, allocation and use of the materials.
12. When requesting payment for such materials, the Contractor shall submit with the partial estimate duly authenticated documents of title, such as bills of sale, invoices or warehouse receipts, all in quadruplicate. The executed bills of sale shall transfer title to the materials from the Contractor to the City (in the event that the invoices state that the material has been purchased by a subcontractor, bills of sale in quadruplicate will also be required transferring title to the materials

from subcontractor to the Contractor).

13. Where the Contractor, with the approval of the Commissioner, has purchased unusually large quantities of materials in order to assure their availability for the work, the Commissioner, at the Commissioner's option, may waive the requirements of Paragraph 12 provided the Contractor furnishes evidence in the form of an affidavit from the Contractor in quadruplicate, and such other proof as the Commissioner may require, that the Contractor is the sole owner of such materials and has purchased them free and clear of all liens and other encumbrances. In such event, the Contractor shall pay for such materials and submit proof thereof, in the same manner as provided in Paragraph 12 hereof, within seven (7) days after receipt of payment therefor from the Comptroller. Failure on the part of the Contractor to submit satisfactory evidence that all such materials have been paid for in full, shall preclude the Contractor from payments under the Contract.
14. The Contractor shall include in each succeeding partial estimate requisition a summary of materials stored which shall set forth the quantity and value of materials in storage, on or off the site, at the end of each preceding estimate period; the amount removed for incorporation in the work; the quantity and value of materials delivered during the current period and the total value of materials on hand for which payment thereof will be included in the current payment estimate.
15. Upon proof to the satisfaction of the Commissioner of the actual cost of such materials and upon submission of proper proof of title as required under Paragraph 12 or Paragraph 13 hereof, payment will be made therefore to the extent of 85%, provided however, that the cost so verified, established and approved shall not exceed the estimated cost of such materials included in the approved detailed breakdown estimate submitted in accordance with Article 41 of the Contract; if it does, the City will pay only 85% approved estimated cost.
16. Upon the incorporation in the work of any such materials, which have been paid for in advance of such incorporation in accordance with the foregoing provisions, payment will be made for such materials incorporated in the work pursuant to Article 42 of the Contract, less any sums paid pursuant to Paragraph 15 herein.

D. **EXCISE AND TRANSPORTATION TAXES**- Pursuant to Section 6 of the "Information for Bidders", the Contractor may be exempted from the payment of Federal Excise and Transportation Taxes in accord with the following:

1. Excise Tax Exemption Certificate will be certified by the Department of Design and Construction where requested by the Contractor, for items which fall within the scope of the Contract and which may be exempt from Federal Excise Tax.
2. **TRANSPORTATION TAX** - The 3% Federal Tax has been repealed and is hereby deleted from the Contract. The 10% Federal Tax for travel remains in effect.

E. **CORRESPONDENCE** - There shall be six (6) copies of all letters of correspondence to the Department of Design and Construction. An additional copy of all correspondence shall be sent directly to the Resident Engineer at the job site.

F. **MOBILIZATION PAYMENT** - A line item for mobilization shall be allowed on the Contractor's Detailed Estimate Breakdown submitted in accordance with Article 41 of the Contract. The Mobilization Payment is intended to include the cost of required bonds, insurance coverage and/or any other expenses required for the initiation of the Contract Work. All costs for mobilization shall be deemed included in the total Contract Price. The Detailed Estimate shall reflect, and the Mobilization Payment shall be made, in accordance with the following schedule:

Contract Amount		Percent	Mobilization
Less than \$	50,000	x 0 =	0
\$	50,000 - \$	100,000	= \$ 6,000
\$	100,001 - \$	500,000	x 6 = \$ 6,000 (min) - \$ 30,000 (max)

\$ 500,001 - \$ 2,500,000	x	5	=	\$ 30,000 (min) - \$ 125,000 (max)
Over \$ 2,500,000	x	4	=	\$ 125,000 (min) - \$ 300,000 (max)

The Contractor may requisition for one-half (1/2) of the Mobilization Payment upon satisfactory completion of the following:

1. Installation of any required field office(s).
2. Submission of all required insurance certificates and bonds.
3. Approval by the Department of Design and Construction of the coordinated progress schedule for the project and the Contractor's Shop Drawing schedule.

The remaining balance of the Mobilization Payment may be requisitioned only after 10 percent (10%) of the Contract price, exclusive of the total amount of Mobilization Payments made or to be made hereunder, shall have been approved for payment.

#### 1.04 Contract Drawings

- A. SCHEDULE C - The Contract Drawings are listed in Schedule C, which is set forth in the Addendum to the General Conditions. Such drawings referred to in the Contract, and in the applicable Specifications for the various Contracts bear the general title:

City of New York  
 Department of Design and Construction  
 Division of Structures

- B. DOCUMENTS FURNISHED TO THE CONTRACTOR - After the award of the Contract, the Contractor for General Construction Work will be furnished with five (5) sets of paper prints of all Contract Drawings mentioned in Paragraph A above.

- C. PRINTS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

Each Contractor, other than the Contractor for General Construction Work referred to in Paragraph B, will receive two (2) sets of paper prints of all Drawings listed in Paragraph A and three (3) sets of paper prints of all Contract Drawings applying directly to each Contractor's own Contract.

- D. Each Contractor will receive nine (9) complete sets of Specifications.
- E. ADDITIONAL COPIES of Drawings and Specifications, when requested, will be furnished to the Contractor if available.

- F. COORDINATION AND COOPERATION - Since the Contracts are all related to the project, the Contractor shall consult and study the requirement of the Contract Drawings and Specifications of all Contracts furnished to the Contractor, so that the Contractor may become acquainted with the work of the project as a whole in order to achieve the proper coordination and cooperation necessary for the efficient and timely performance of the work.

- G. SUPPLEMENTARY DRAWINGS - When, in the opinion of the Commissioner, it becomes necessary to more fully explain the work to be done, or to illustrate the work further, or to show any changes which may be required, drawings known as Supplementary Drawings will be prepared by the Commissioner.

- H. COMPENSATION - Where Supplementary Drawings entail extra work, compensation therefor to the Contractor shall be subject to the terms of the "Contract". The Supplementary Drawings shall be binding upon the Contractor with the same force as the Contract Drawings.

- I. **SUPPLEMENTARY DRAWING PRINTS** - Three (3) copies of prints of these Supplementary Drawings will be furnished to the Contractor.
- J. **COPIES TO SUBCONTRACTORS** - The Contractor shall furnish each of its subcontractors and material suppliers such copies of Contract Drawings, Supplementary Drawings, or copies of the Specifications as may be required for its work.
- K. **CONTRACTOR TO CHECK DRAWINGS** - The Contractor shall verify all dimensions, quantities and details shown on the Contract Drawings, Schedules, or other data received from the Commissioner, and shall notify the Commissioner of all errors, omissions, conflicts and discrepancies found therein. Notice of such errors shall be given before the Contractor proceeds with any work. Figures shall be used in preference to scale dimensions and large-scale drawings in preference to small-scale drawings.

#### **1.05 Shop Drawings and Record Drawings**

##### **A. SHOP DRAWINGS**

1. **SUBMISSION OF SHOP DRAWINGS** - For instructions relative to Shop Drawings involving electrical or mechanical work or equipment of any nature called for in any Contract, see the General Electrical Requirements and the General Mechanical Requirements.
2. **SHOP DRAWINGS** - The Contractor shall promptly prepare and submit layout detail and Shop Drawings of such parts of the work as are indicated in the Specifications or as required. These Shop Drawings shall be made in accordance with the Contract Drawings, Specifications and Supplementary Drawings, if any. The Shop Drawings shall be accurate and distinct and give all the dimensions required for the fabrication, erection and installation of the work.
3. **SIZE OF DRAWINGS** - The Shop Drawings, unless otherwise directed, shall preferably be on sheets of the same size as the Contract Drawings, with a one half (1/2) inch marginal space on each side and a two (2) inch marginal space for binding on the left side.
4. **SCOPE OF DRAWINGS** - Shop Drawings shall be numbered consecutively and shall accurately and distinctly represent the following:
  - a. All working and erection dimensions.
  - b. Arrangements and sectional views.
  - c. Necessary details, including performance characteristics, and complete information for making necessary connections with other work.
  - d. Kinds of materials including thicknesses and finishes.
  - e. All other information required by the Commissioner.
5. **TITLES AND REFERENCE** - Shop Drawings shall be dated and contain:
  - a. Name of the Project, DDC Project Number and Contract Number.
  - b. The descriptive names of equipment, or materials covered by the Contract Drawings and the classified item number or numbers, if any, under which it is, or they are required.
  - c. The locations or points at which materials, or equipment, are to be installed in the work.
  - d. Cross references to the section number, detail number and paragraph number of the Contract Specifications.

- e. Cross references to the sheet number, detail number, etc., of the Contract Drawings.

NOTE: In addition to the above requirements, the Shop Drawings shall bear a stamp having the following wording:

FIELD MEASUREMENTS - The Contractor certifies that it has verified and supplemented the Contract Drawings by taking all required field measurements, that said measurements correctly reflect all field conditions and that this Shop Drawing incorporates said measurements.

6. **THE SUBMISSION OF SHOP DRAWINGS** - The Shop Drawings shall be accompanied by a letter of transmittal, in triplicate, containing the name of the Project, the name of the Contractor, the number of Drawings, titles and any other requirements. Re-submission of the same drawings shall bear the original number of the drawings and the original titles.
7. **PRELIMINARY SUBMISSION** - The Contractor shall submit one (1) set of sepia Shop Drawings to the Consultant Architect/Engineer for their approval. A satisfactory Shop Drawing will be stamped "Approved", be dated and one (1) copy thereof will be returned to the Contractor by letter. Should the Shop Drawing not be approved by the Consultant Architect/Engineer, the Commissioner will return the sepia Shop Drawings with the necessary corrections and changes to be made as indicated thereon.
8. **REVISIONS** - The Contractor must make such corrections and changes and again submit one (1) set of sepia drawings for the approval of the Consultant Architect/Engineer. The Contractor shall revise and resubmit the Shop Drawing as required by the Consultant Architect/Engineer until approval thereof is obtained. However, Shop Drawings which have been stamped "Approved As Noted" shall be considered an "Approved" Shop Drawing and NEED NOT be revised and resubmitted.  
  
No work called for by the Shop Drawings shall be done until the approval of the said drawings by the Consultant Architect/Engineer is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractors which Shop Drawing indicated work related to, adjacent to, impinging upon, or affecting work to be done by other Contractors, shall be transmitted to the Contractors so affected. These approved Shop Drawings shall be delivered to the Resident Engineer for distribution to the affected Contractors at the job meetings and shall be so recorded in the minutes.
9. **FINAL SUBMISSION** - When approval of any Shop Drawing is obtained by the Contractor, it shall insert the date of the approval of the drawing and promptly furnish the Consultant Architect/Engineer with eight (8) additional prints of the approved Drawings. No work called for by the Shop Drawings shall be performed until the approval of the said drawings by the Commissioner is given. In addition to the foregoing Shop Drawing transmissions, a copy of any Shop Drawing prepared by any of the Contractors which indicates work related to, adjacent to, impinging upon, or affecting work to be done by other Contractors, shall be transmitted to the Contractors so affected. These approved Shop Drawings shall be delivered to the Resident Engineer for distribution to the affected Contractors at the job meetings and shall be so recorded in the minutes.
10. **VARIATIONS** - If the Shop Drawings show variations from the Contract requirements because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in its letter of submittal. Approval of the Shop Drawings shall constitute approval of the subject matter thereof only and not of any structural apparatus shown or indicated.
11. **CATALOGUE CUTS** - Except as otherwise prescribed herein, the submission of catalogue cuts shall conform to the procedures specified for Shop Drawings.
  - a. **PRELIMINARY SUBMISSION** - The Contractor shall submit three (3) sets of catalogue cuts to the Consultant Architect/Engineer to approve. A satisfactory catalogue cut will be stamped

"Approved", be dated and one (1) copy thereof will be returned to the Contractor by letter. Should the catalogue cut not be approved by the Commissioner, the Commissioner will return one (1) set of such catalogue cuts with the necessary corrections and changes to be made indicated thereon.

- b. REVISIONS - The Contractor shall make such corrections and changes and again submit four (4) sets of the catalogue cuts, in duplicate, for the approval of the Commissioner. The Contractor shall revise and resubmit the catalogue cuts as required by the Consultant Architect/Engineer until approval thereof is obtained.

However, catalogue cuts which have been stamped "Approved As Noted" shall be considered an "Approved" catalogue cut and need not be revised and resubmitted.

- c. FINAL SUBMISSION - When approval of any catalogue cut is obtained by the Contractor, it shall insert the date of the approval and promptly furnish the Consultant Architect/Engineer with four (4) additional sets of the approved catalogue cuts.

12. RESPONSIBILITY OF CONTRACTOR - The approval of Shop Drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such Shop Drawings, nor for the proper fitting and construction of the work, nor of the furnishing of materials or work required by the Contract and not indicated on the Shop Drawings. Approval of Shop Drawings shall not be construed as approving departures from the Contract Drawings, Supplementary Drawings or Specifications.

13. SHOP DRAWINGS AND MATERIAL SAMPLES SCHEDULE - The Shop Drawings and Material Samples Schedule is set forth in Schedule F, which is included in the Addendum to the General Conditions. Completion of this Schedule shall be in accordance with Article 1.41 (A) of these General Conditions.

14. PROCEDURE FOR PREPARING, FORWARDING, CHECKING AND RETURN - of all Shop Drawings shall be, generally, as follows:

The Contractor shall make available to its subcontractors the necessary Contract Documents and have them determine dimensions and conditions in the field, particularly with reference to coordination with other trades or work under other Contractors. The Contractor shall direct its subcontractors to prepare Shop Drawings for submission to the Consultant Architect/Engineer in accordance with the requirements of these General Conditions. The Contractor shall also direct its subcontractors to "Ring Up" corrections made on all re-submissions for approval, so as to be readily seen, and that the symbol "sub" be used to identify the source of the correction or information that has been added.

The Contractor shall:

- a. Review and be responsible to the Commissioner, or the Commissioner's authorized representative, for information shown on subcontractor's Shop and Installation drawings and manufacturers' date, and also for conformity to Contract Documents.
- b. "Ring Up" corrections made on all submissions for approval, so as to be readily seen, and that the symbol "GC", "PL", "HVAC" or "EL" be used to indicate that the correction and/or information added was made by the Contractor.
- c. Clearly designate which trade is to perform the work when the term, "work by others" or other similar phrases are indicated on the Contract Drawings before submission to the Consultant Architect/Engineer.
- d. Stamp submissions "Recommended for Approval", date and forward to the Commissioner or the Commissioner's authorized representative.

In order to expedite Shop Drawing procedures, the Contractor shall write a Shop Drawing status letter directly to the Consultant Architect/Engineer, each week, containing the following subject matter:

- (1) A list of all Shop Drawings which have been sent to but not returned by the Architect or Engineer giving name of the subcontractor, drawing number, title and date of submission.
- (2) An indication of the desired priority of the return, if necessary.

NOTE: The status letter shall be prepared and sent at a given time each week, preferably Friday afternoon, to enable the Consultant Architect/Engineer to receive the letter on Monday morning. This procedure shall be maintained throughout the active Shop Drawing period of construction.

**B. INTEGRATED DRAWINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. The Contractor for General Construction Work shall provide to the Contractor for Heating, Ventilating and Air Conditioning Work reflected ceiling starting points or plans, beam soffit elevations, ceiling heights, roof openings, etc.
2. The Contractor for Heating, Ventilating and Air Conditioning Work shall prepare a drawing or drawings showing ductwork, heating and sprinkler piping. This drawing shall include location of grilles, registers, etc. and access doors in hung ceilings. Locations shall be fixed by elevations and dimensions from column center lines and/or walls.
3. The Contractor for Heating, Ventilating and Air Conditioning Work shall prepare and distribute to each of the other Contractors, the Resident Engineer and to the Consultant Architect a sepia of the above.
4. The Contractor for General Construction Work shall lay out on its sepia, the reflected ceiling plan, beam soffit elevations, ceiling heights, roof openings, etc.
5. The Contractor for Plumbing Work shall lay out its piping, valves, cleanouts, etc., indicating locations and elevations and shall indicate the necessary access doors.
6. The Contractor for Electrical Work shall indicate its fixtures, large conduit runs, clearances, pull boxes, junction boxes, sound system speakers, etc.
7. The Resident Engineer will call as many meetings with the Contractors as are necessary to resolve any conflicts that become apparent. The Resident Engineer will call on the services of the Consultant Engineer or Architect where necessary. The Resident Engineer is responsible for the coordination of the Contract Drawings.
8. Upon resolution of the conflicts, each Contractor shall enter its own work on the Resident Engineer's sepia, which will become the Master or Integrated Drawing. The Master Sepia shall be signed by each Contractor to indicate its acceptance of the arrangement of the work.
9. A reproducible copy of the Master Integrated Drawing or Drawings will be prepared and distributed by the Contractor for Heating, Ventilating and Air Conditioning Work to each Contractor and to the Consultant Architect for information.
10. Each Contractor shall prepare its Shop Drawings in accordance with the Integrated Drawings. No work will be permitted without approved Shop Drawings. It is therefore essential that this procedure be instituted as quickly as possible.
11. Contractors shall be held strictly accountable for cooperation in preparing the Integrated Drawing or Drawings.

C. RECORD DRAWINGS

1. The Department of Design and Construction, at the start of construction (kick-off meeting), will furnish to each Contractor at no cost a complete set of Contract Document mylars pertaining to the work to be performed under its Contract. It is the responsibility of each Contractor to modify the Contract Drawings to indicate all changes and corrections, if any, occurring in the work as actually installed. The Contractor is required to furnish all other mylar drawings if necessary such as Addenda Drawings and Supplementary Drawings as may be necessary to indicate all work in detail as actually completed.

NOTE TO CONTRACTOR: All professional seals must be blocked out. Title box complete with project title and Consultants' names will remain.

2. Each Contractor shall maintain, during the progress of the work, an accurate record of the work as actually installed, on Record Drawings, on mylar, in ink. These Record Drawings shall be made available to the Resident Engineer upon request.

The Contractor's attention is particularly directed to the necessity of keeping accurate records of all subsurface and concealed work, so that the Record Drawings may contain this information in exact detail and location. Record Drawings should also show all connections, valves, gates, switches, cut-outs and similar operating equipment.

Before substantial completion payment, each Contractor shall furnish to the Commissioner one (1) complete set of mylar Record Drawings, in ink indicating all of the work and locations as actually installed, plus one (1) set of paper prints which will be furnished to sponsoring agency by Department of Design and Construction.

3. Record Drawings shall be of the same size as that of the Contract Drawings, with a one (1) inch margin on three (3) sides and a two (2) inch margin on the left side.
4. Each Record Drawing shall bear the legend "RECORD DRAWING" in heavy block lettering, one half (1/2) inch high, and contain the following data:

RECORD DRAWING

Contractor's Name \_\_\_\_\_

Contractor's Address \_\_\_\_\_

Made by . Date \_\_\_\_\_

Checked by Date \_\_\_\_\_

Commissioner's Representatives

(Resident Engineer)	DDC
(Plumbing Inspector)	DDC
(Heating & Ventilating Inspector)	DDC
(Electrical Inspector)	DDC

5. RECORD DRAWING TITLE SHEET - Each Contractor shall prepare a title sheet, the same size as Record Drawings, which shall contain the following:

a. Heading:

The City of New York  
Department of Design and Construction  
Division of Structures

- b. Capital Budget Project Number (CAPIS ID)

- c. Name and Location of Project
  - d. Contractor's Name and Address
  - e. Record of changes (a caption description of work affected, and the date and number of Change Order or other authorization)
  - f. List of Record Drawings
6. All changes from Contract Drawings shall be distinctly encircled and identified by Change Order number correlating to changes listed on the "Title Sheet." The Contractor shall show within the encircled areas the work as actually installed.
7. BULLETINS, OPERATING AND SERVICE MANUALS - Where the Contractor has submitted prints in the form of technical bulletins, operating and service manuals, or other printed matter as a Shop Drawing, having diagrams or drawings thereon of a material or equipment installed in the work, the Contractor shall furnish three (3) sets thereof so that the Commissioner may have all the necessary information for the proper operation maintenance and repair of the material and equipment and the ordering of spare parts. All bulletins and operating and service manuals shall be compiled and indexed in book form for each Contract.

**1.06 Approval of Materials**

- A. LOCAL LAWS - All materials, appliances and types or methods of construction shall be in accordance with the Specifications and shall in no event be less than that necessary to conform to the requirements of the Building Code of the City of New York, Administrative Code and Charter of the City of New York.
- B. APPROVAL OF MANUFACTURER - The names of proposed manufacturers, material suppliers, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Commissioner for approval, as early as possible, to afford proper review and analysis.
- C. REPUTE OF MANUFACTURER - No manufacturer will be approved for any materials to be furnished under the Contract unless it shall be of good reputation, shall have a plant of ample capacity and shall have successfully produced similar products. All required approvals for legal use of materials and equipment such as B.S.A. and M.E.A. must be obtained prior to installation.
- D. ALL MATERIALS - fixtures, fittings, supplies and equipment furnished under the Contract shall be new and unused, except as approved by the Agency, and of standard first-grade quality and of the best workmanship and design. The City of New York encourages the use of recycled products where practical.
- E. INFORMATION TO SUPPLIERS - In asking for prices on materials under any item of the Contract, the Contractor shall provide the manufacturer or dealer with such complete information from the Specifications and Contract Drawings as may in any case be necessary, and in every case the Contractor shall inform the manufacturer or dealer of all the General Conditions and requirements herein contained.
- F. STANDARD REFERENCES - Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for bids, even though reference has been made to an earlier standard.
- G. REFERENCES - Reference to a technical society, organization or body may be made in the Specifications by abbreviations in accordance with the following list:
  - A.I.A. for American Institute of Architects

A.C.I.	for American Concrete Institute
A.G.A.	for American Gas Association
A.G.M.A.	for American Gear Manufacturer Association
A.I.E.E.	for American Institute of Electrical Engineers
A.I.S.C.	for American Institute of Steel Construction
A.S.A.	for American Standards Association
A.S.T.M.	for American Society for Testing Materials
A.W.S.C.	for American Welding Society Code
A.W.W.A.	for American Water Works Association
B.S. & A.	for New York City Board of Standards & Appeals
C.I.P.R.A.	for Cast Iron Pipe Research Association
B.G. & E.	for Bureau of Gas & Electricity of the City of New York
FED. SPEC.	for Federal Specification
I.P.C.E.A.	for Insulated Power Cable Engineer's Association
NAVY SPEC.	for Navy Department Specification
N.E.C.	for National Electric Code
N.E.M.A.	for National Electrical Manufacturers Association
N.Y.B.C.	for New York City Building Code
N.Y.E.C.	for New York City Electrical Code
N.Y. SPEC.	for New York City Department of Purchase Specification
P.P.S.	for Power Piping Society
S.A.E.	for Society of Automotive Engineers Standards
S.H.B.I.	for Steel Heating Boiler Institute

H. STANDARD SPECIFICATIONS - When no reference is made to a code, standard or specification, the Standard Specifications of the ASTM or the AIEE, as the case may be, shall govern.

I. SAMPLES OF MATERIALS - The Contractor shall submit to the Commissioner for approval, samples of all materials specified to be used in the project.

1. For samples of materials involving electrical work of any nature, see the General Electrical Requirements.
2. Samples shall be in triplicate, of sufficient size to show the quality, type, range of color, finish and texture of the material. However, in addition thereto, after approval, three (3) additional samples showing the material, color and texture of all interior finishes, including the finishes of exposed built-in equipment, trim, glazing, fittings and fixtures, etc., shall also be furnished. The sizes of these additional samples shall be as directed by and acceptable to the Commissioner.
3. Each of the samples shall be labeled, bearing the name and quality of the material, the Contractor's name, date, Contract and project, and the related Specification or Contract Drawing reference to the samples submitted.
4. A letter of transmittal, in triplicate, from the Contractor requesting approval must accompany all such samples.
5. Transportation charges to the Commissioner's office must be prepared on all samples forwarded.
6. Samples for testing purposes shall be as required in the Specifications.

J. SAMPLES ON DISPLAY - When samples are specified to be equal to samples in the office of the Commissioner, they shall be carefully examined by the bidders and by those whom the bidder expects to employ for the furnishing of such materials.

K. TIMELY SUBMISSIONS LOG/SCHEDULE - Samples shall be submitted in accordance with approved Shop Drawing log so as to permit proper consideration without delaying any operation under the project. Materials should not be ordered until approval is received, in writing, from the Commissioner. All materials shall be furnished equal in every respect to the approved samples.

- L. THE APPROVAL OF ANY SAMPLES - will be given as promptly as possible, and shall be only for the characteristic color, texture, strength, or other feature of the material named in such approval, and no other. When this approval is issued by the Commissioner, it is done with the distinct understanding that the materials to be furnished will fully and completely comply with the Specifications, the determination of which may be made at some later date by a laboratory test or by other procedure. Use of materials will be permitted only so long as the quality remains equal to the approved samples and complies in every respect with the Specifications, and the colors and textures of the samples on file in the Office of the Commissioner, for the project.
- M. ACCEPTIBILITY OF TEST DATA - The Commissioner will be the final judge as to acceptability of laboratory test data and performance in service of materials submitted.
- N. VALUABLE SAMPLES - such as hardware, plumbing and electrical fixtures, etc., not destroyed by inspection or test, will be returned to the Contractor and may be incorporated into the work after all questions of acceptability have been settled, providing suitable permanent records are made as to the location of the samples, their properties, etc.
- O. EQUIVALENT QUALITY OF MATERIALS - All materials and equipment which are designated in the Specifications by a number in the catalogue of any manufacturer or by a manufacturer's grade or trade name, are designated for the purpose of describing the article and fixing the standard or the quality and finish. Materials and equipment, which are, in the opinion of the Commissioner, the equivalent to that specified, will be acceptable.
- P. The submission of any material, or article, as the equal of the materials or articles set forth in the Specifications as a standard shall be accompanied by illustrations, drawings, descriptions, catalogues, records of tests, samples and any and all other information essential for judging the equality to the materials, finish and durability of that specified as standard, as well as information indicating satisfactory use under similar operating conditions.
- Q. MANUFACTURER'S DIRECTIONS - Where the Specifications provide that the manufacturer's directions are to be used, such printed directions shall be submitted to the Commissioner.
- R. COMMISSIONER TO SELECT INSPECTORS - Except as specifically provided in the Specifications, the Commissioner will select and designate all persons, firms, or corporations to make or witness each and every inspection, test or analyses, with or without reports.
- S. NOTICE - The Contractor shall give notice in writing to the Commissioner sufficiently in advance of its intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Commissioner will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials, or the Commissioner will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or the Commissioner will notify the Contractor that inspection will be waived.
- T. NO SHIPPING BEFORE INSPECTION - The Contractor shall comply with the foregoing before shipping any material.
- U. CERTIFICATE OF MANUFACTURE - When the Commissioner so requires, the Contractor shall furnish to the Commissioner authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Specifications. These certificates shall include copies of the results of physical tests and chemical analyses where necessary, that have been made directly on the product, or on similar products being fabricated by the manufacturer. This may include such approvals as B.S.A., M.E.A., B.E.C. Advisory Board, etc.

- V. ACCEPTANCE - When materials or manufactured products shall comprise such quantity that it is not practical to make physical tests or chemical analyses directly on the product furnished, a certificate stating the results of such tests or analyses of similar materials which were concurrently produced may, at the discretion of the Commissioner, be considered as the basis for the acceptance of such material or manufactured product.
- W. TESTING COMPLIANCE - The testing personnel shall make the necessary inspections and tests, and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Specifications, indicating thereon all analyses and/or test data and interpreted results thereof.
- X. REPORTS - Six (6) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Commissioner as prerequisite for the acceptance of any material or equipment.
- Y. REJECTIONS - If, in making any test, it is ascertained by the Commissioner that the material or equipment does not comply with the Specifications, the Contractor will be notified thereof, and will be directed to refrain from delivering said materials or equipment, or to promptly remove it from the site or from the work and replace it with acceptable material without cost to the City.
- Z. FURNISH DESIGNATED MATERIAL - Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Specifications, the Contractor shall immediately proceed to furnish the designated material or equipment.
- AA. COST OF TESTS BORNE BY CITY - Where the City directs test to be performed to determine compliance with the Specifications regarding materials or equipment, and where such compliance is ascertained as a result thereof, the City will bear the cost of such tests.
- BB. COST OF TESTS BORNE BY CONTRACTOR - Where tests are specifically called for in the Specifications to be made by the Contractor, the cost thereof shall be borne by the Contractor and shall be deemed to be included in the Contract price. The expenses of the testing personnel assigned by the City shall not be the Contractor's obligation. The Contractor shall reimburse the City for expenditures incurred in the making of tests on materials and equipment submitted by the Contractor as the equivalent of that specifically named in the Specifications and rejected for non-compliance.

**1.07 Delivery of Materials**

- A. MATERIAL ORDERS - The Contractor shall furnish to the Commissioner a copy of each material order, indicating date of order and quantity of material, and shall also notify the Commissioner when materials have been delivered to the site and in what quantities.
- B. AMPLE QUANTITIES - The Contractor shall deliver materials in ample quantities to insure the most prompt and uninterrupted progress of the work so as to complete the work within the Contract time.
- C. CONTAINERS - The manufacturer's containers shall be delivered with unbroken seals and shall bear proper labels.
- D. THE CONTRACTOR SHALL COORDINATE DELIVERIES - in order to avoid delaying or impeding the progress of the work of any related Contractor.
- E. STACKING - All materials shall be properly stacked in convenient places adjacent to the site, or where directed, and protected in a satisfactory manner. Stacked materials shall be so arranged as to not interfere with visibility of traffic control devices.
- F. OVERLOADING - If authority is given to store materials in any part of the project area, they shall be so stored as to cause no overloading.
- G. NO INTERFERENCE - If it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the work or interfering with the work to be done by any other Contractor, the relevant Contractor shall remove and restack such materials at no additional cost to the City.

**1.08 Temporary Structures**

- A. **FIELD OFFICE FOR CONTRACTOR** - The Contractor shall establish a temporary field office for its own use at the site during the period of construction, at which readily accessible copies of all Contract Documents shall be kept.
- B. The field office shall be located where it will not interfere with the progress of any part of the work or with visibility of traffic control devices.
- C. **CONTRACTOR'S REPRESENTATIVE** - In charge of each office there shall be a responsible and competent representative of the Contractor, duly authorized to receive orders and directions and to put them into effect.
- D. **TELEPHONE ARRANGEMENTS** - Arrangements shall be made by the Contractor whereby its representative may be readily accessible by telephone.
- E. **MATERIAL SHEDS** - used by the Contractor for the storage of its materials shall be kept at locations which will not interfere at any time with the progress of any part of the work or with visibility of traffic control devices.
- F. **SUBSTANTIAL CONSTRUCTION** - All temporary structures shall be of substantial construction and neat appearance, and shall be painted a uniform gray unless otherwise directed by the Commissioner.
- G. **ADVERTISING PRIVILEGES** - The City reserves the right to all advertising privileges. The Contractor shall not cause any signs of any kind to be displayed at the site unless specifically required herein or authorized by the Commissioner.
- H. **CONTRACTOR'S SIGN** - The Contractor shall post and keep posted, on the outside of its field office, office or exterior fence or wall at site of work, a legible sign giving full name of the company, address of the company and telephone number(s) of responsible representative(s) of the firm who can be reached in event of an emergency at any time.

**1.09 Surveys (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. **LINE AND GRADE** - The City will establish a baseline and bench mark near the site of the work for use of the Contractor in connection with the performance of the work.
- B. **RESPONSIBILITY** - The Contractor shall establish all other lines and elevations required for its work and shall be solely responsible for the accuracy thereof.
- C. **SAFEGUARD ALL POINTS** - Each Contractor shall safeguard all points, stakes, grade marks and bench marks made or established by the Contractor on the work, shall re-establish same if disturbed and bear the entire expense of rectifying the work improperly installed due to not maintaining, not protecting or removing without authorization such established points, stakes, or marks.
- D. **CITY MONUMENTS AND MARKS** - No work shall be performed near City monuments or marks so as to disturb them until the said monuments or marks have been referenced or reset or otherwise disposed of by the relevant Agency or party who installed them.
- E. **FOUNDATIONS** - The Contractor for General Construction Work shall furnish certification from a licensed Surveyor that all portions of the foundation work are located in accordance with the Contract Drawings and at the elevations required thereby. This certification shall show the actual locations and the actual elevations of all the work in relation to the locations and elevations shown on the Contract Drawings, including but not restricted to the following:
  - 1. The locations and elevations of all piles, if any.

2. Elevations of tops of all spread footings, tops of pile caps, and tops of all foundation walls, elevator pit walls and ramp walls.
  3. Location of all footing centers and pier centers including those for exterior wall columns.
  4. Location of all foundation walls including wall columns, elevator pit walls and ramp walls.
- F. **WALL LINES** - After the first courses of masonry or stone have been laid, the Contractor for General Construction Work shall establish the permanent lines of exterior walls. Such Contractor shall furnish promptly, certification from a licensed Surveyor, in the form of signed original drawings showing the exact location of such wall lines, of all portions of all structures. Except at its own risk, the Contractor for General Construction Work shall not proceed further with the erection of walls until the Surveyor's certification has been submitted and verified for correct location of wall lines.
- G. **SURVEYOR** - The Surveyor selected for any of the purposes mentioned in Paragraph E and Paragraph F above, and Paragraph I below, shall be a licensed Surveyor and shall be subject to the approval of the Commissioner. The Surveyor shall not be a regular employee of the Contractor, nor shall the Surveyor have any interest in the Contract. The Surveyor shall not be employed by the Contractor in laying out any work, it being intended that the Surveyor's certification shall represent an independent and disinterested verification of such layout. The Surveyor shall report to the Department of Design and Construction's Resident Engineer each time upon arrival to and departure from the site and review with the Resident Engineer the data required for the project.
- H. **FINAL CERTIFICATION** - Final certification shall be submitted upon completion of the work or upon completion of any subdivision of the work as directed by the Commissioner. Any exceptions or deviations from the drawings shall be noted on the final certificate and there shall be included any maps, plates, notes, pertinent documents and data necessary, in the opinion of the Commissioner, to constitute a full and complete report.
- I. **FINAL SURVEY** - The Contractor for General Construction Work shall submit to the Department of Design and Construction for submission to the Department of Buildings a final Survey by the licensed Surveyor showing the location of the new Structure, before completion of the Structure. This Survey shall show the location of the first tier of beams or of the first floor; the finish grades of the open spaces on the plot; the established curb level and the location of all other Structures on the plan, together with the location and boundaries of the lot or plot upon which the Structure is constructed, curb cuts, all yard dimensions, etc.

#### **1.10 Contractor's Superintendent**

- A. **SUPERINTENDENT** - The Contractor shall devote its time and personal attention to the work and shall employ and retain at the project site, from the commencement until the entire completion of the work, a Contractor's Superintendent competent and capable of maintaining proper supervision and care of the work and acceptable to the Commissioner, who, in the absence of the Contractor, and irrespective of any superintendent or foreman employed by any subcontractor, shall see that the instructions of the Commissioner are carried out.
- B. **REPLACEMENT** - The Contractor's Superintendent on the job shall not be changed or removed without the consent of the Commissioner.

#### **1.11 Permits**

The Contractor shall comply with all local, state and federal laws, rules and regulations affecting the Work of this Project, including, without limitation, (1) obtaining all necessary permits for the performance of the Work prior to commencement thereof, and (2) complying with all requirements for the disposal of demolition and/or construction debris, waste, etc., including disposal in City landfills. The Contractor shall be responsible for all costs in connection with such regulatory compliance, unless otherwise specified in the Contract.

## 1.12 Transportation

- A. AVAILABILITY - It shall be the duty of the Contractor to determine the availability of transportation facilities and dockage for the use of its employees, equipment and material and the conditions under which such use will be permitted.
- B. COSTS - If transportation facilities and dockage are available and are permitted to be used by the governmental agency having jurisdiction, the Contractor shall pay all necessary costs and expenses, and abide by all rules and regulations promulgated in connection therewith.
- C. VEHICLES - With respect to the use of vehicles on highways and bridges, the Contractor's attention is directed to the limitations set forth in the Rules of the City of New York, Title 34, Chapter 4, Section 4-15.
- D. CONTINUED USE - It is understood that the Commissioner makes no warranty as to the continued use by the Contractor of such facilities.

## 1.13 Sleeves And Hangers (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. COORDINATE TO PROGRESS SCHEDULE - Contractors required to furnish and install conduits, outlets, piping sleeves, boxes, inserts and all other materials and equipment necessary to be built into the work to be performed by the Contractor for General Construction Work, shall promptly furnish and set such sleeves or other materials in conformity with the requirements of the project.
- B. COOPERATION OF CONTRACTORS - All Contractors shall fully cooperate with each other in connection with the performance of the above work as "cutting in" new work is neither contemplated nor will it be tolerated.
- C. TIMELINESS - In the event that timely delivery of sleeves and other materials cannot be made, and to avoid delay, the affected Contractor may arrange to have boxes or other forms set at the locations where the piping or other material is to pass through or into the slabs, walls or other work. Upon the subsequent installation of the sleeves or other material, the Contractor for General Construction Work shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors responsible therefore.
- D. INSERTS - The Contractor for General Construction Work is to install strip inserts four (4) foot on center and perpendicular to beams in ceiling slabs of boiler, machine and mechanical equipment rooms. Inserts are to be installed for strippable concrete slabs only.

## 1.14 Cutting And Patching

- A. RESPONSIBILITY - Each Contractor shall do all cutting, patching and restoration required by its work, unless otherwise particularly specified in the Specifications of its Contract.
- B. RESTORE WORK - Each Contractor shall restore any work they damage that is the work of another Contractor.
- C. COMPETENT WORKERS - All restoration work shall be done to the satisfaction of the Commissioner by competent workers skilled in the trade required by such restoration. If, in the judgment of the Commissioner, workers engaged in restoration work are incompetent, they shall be replaced immediately by competent workers.
- D. REMOVALS - Each Contractor must remove from the premises all demolished materials of every nature or description resulting from cutting, patching and restoration work, in accordance with the requirements hereinafter stipulated under article on REMOVAL OF RUBBISH AND SURPLUS MATERIALS.

**1.15 Temporary Heat (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

**A. GENERAL**

1. Definition - The provision of Temporary Heat shall mean the provision of heat in order to permit construction to be performed in accordance with the Progress Schedule during all seasons of the year and to protect the work from the harmful effects of low temperature. In the event the building, or any portion thereof, is occupied during construction, the provision of Temporary Heat shall include the provision of heat to permit normal operations in such occupied areas.
  - a. The provision of Temporary Heat shall be in accordance with the temperature requirements set forth in Paragraph (c) below.
  - b. The provision of Temporary Heat shall include the provision of: 1) all fuel necessary and required, 2) all equipment necessary and required, and 3) all operating labor necessary and required. Operating labor shall mean that minimum force required for the safe day to day operation of the system for the provision of Temporary Heat and shall include, without limitation, heating maintenance labor and/or Firewatch as required by NYC Fire Department regulations. Operating labor may be required seven (7) days per week and during other than normal working hours, for the period of time required by seasonal weather conditions.
  - c. In the event the building, or any portion thereof, is occupied and the Project involves the replacement, modification and/or shut down of the permanent heating system, or any key component thereof; and such system is a combined system which furnishes domestic hot water for the building occupants, the provision of Temporary Heat shall include the provision of domestic hot water at the same temperature as the system which is being replaced. Domestic hot water shall be provided in accordance with the phasing requirements set forth in the Contract Documents.
2. Responsibility – The Contractor responsible for the provision of Temporary Heat, and all expenses in connection therewith, shall be as set forth below.
  - a. Projects Involving Enclosure of the Building
    - (1) Prior to Enclosure - Until the Commissioner determines that the building has been enclosed, as set forth in Paragraph (b) below, each Contractor shall be responsible for the provision of its own Temporary Heat.
    - (2) Post Enclosure - Once the Commissioner determines that the building, or any portion thereof, has been enclosed, as set forth in Paragraph B below, the Contractor for Heating, Ventilating and Air Conditioning Work ("HVAC Work") shall be responsible for the provision of Temporary Heat by one or more of the following means: 1) by an existing heating system (if any), 2) by a permanent heating system which is being installed as part of the Project, or 3) by a temporary heating system(s). The Contractor for HVAC Work shall, within two (2) weeks of the kick-off meeting, submit to DDC for review its proposed plan to provide Temporary Heat. Such plan is subject to approval by the Resident Engineer. The Contractor for HVAC Work shall provide Temporary Heat in accordance with the approved plan until written acceptance by the Commissioner of the work of all Contractors, including punch list work, unless directed otherwise in writing by the Commissioner. The responsibility of the Contractor for HVAC Work provided for herein is subject to the exception set forth in Paragraph H.3.b.(2) below.
  - b. Projects not involving Enclosure of the Building
    - (1) If the Project involves the installation of a new permanent heating system if one did not exist previously, or the replacement, modification and/or shut down of the existing

permanent heating system, or any key component thereof, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat, except as otherwise provided in Paragraph H.3.b.(2) below.

- (2) If the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification and/or shut down of the existing permanent heating system, or any key component thereof; there is no Contractor responsibility of the provision of Temporary Heat, unless otherwise specified in the Contract Documents. However, if the Commissioner, pursuant to Paragraph H.3.b.(1) below, determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat and such Contractor shall be paid for the same in accordance with Paragraph H.3.b.(1).

## B. ENCLOSURE OF STRUCTURES

1. Notification - The Contractor for General Construction Work shall notify all other Contractors and the Resident Engineer at least 30 days prior to the anticipated date that the building(s) will be enclosed.
2. Commissioner Determination - The Commissioner shall determine whether the building, or any portion thereof, has been enclosed. As indicated in Paragraph A above, once the building has been enclosed, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat. The Commissioner's determination with respect to building enclosure shall be based upon all relevant facts and circumstances, including without limitation, 1) whether the building meets the criteria set forth in Paragraph 3 below, and 2) whether the openings in the building, such as doorways and windows, have been sufficiently covered so as to provide reasonable heat retention and protection from the elements.
3. Criteria for enclosure
  - a. Roof Area
    - (1) A building shall be considered to be roofed when the area to be roofed is covered by a permanent structure and all openings through the permanent structure are covered and protected by temporary covers in Paragraph (c) below.
    - (2) Intermediate floor structures of multi-floor buildings shall be considered to be roofed subject to the same requirements of the building roof.
    - (3) The final roofing system need not be in place for the building or structure to be determined to be enclosed; provided, however, all openings through the permanent structure covering the roof must be covered and protected by temporary covers, as described in Paragraph (c) below.
  - b. Walls - For the walls to be determined to be enclosed, permanent exterior wall elements or facing material must be in place and all openings must be covered and protected by temporary covers, as described in Paragraph (c) below.
  - c. Temporary Covers - In order to be acceptable, temporary covers must be securely fixed to prevent the entrance of rain, snow and direct wind. The minimum material requirements for temporary covers are as follows: 1) minimum 10 mil. plastic, 2) minimum 12 ounce waterproof canvas tarpaulins, or 3) a minimum three-eighths (3/8) inch thickness exterior grade plywood.
  - d. Temporary covers for openings shall be the responsibility of the Contractor for General Construction Work, and such work shall be deemed included in the Contractor for General Construction Work's bid price.

C. TEMPERATURE REQUIREMENTS

1. Unoccupied Buildings - The temperature requirement for the provision of Temporary Heat in unoccupied buildings shall be the GREATER of the following: 1) 50 degrees Fahrenheit, or 2) the temperature requirement for the particular type of work set forth in the Contract Documents.
2. Occupied Buildings - The temperature requirement for the provision of Temporary Heat in occupied buildings, or portions thereof, shall be the GREATER of the following: 68 degrees Fahrenheit or the temperature requirement for the particular type of work set forth in the Contract Documents.

D. DURATION

1. The Contractor for HVAC Work shall be required to provide Temporary Heat until written acceptance by the Commissioner of the work of all Contractors, including punch list work, unless directed otherwise in writing by the Commissioner. The Contractor for HVAC Work shall be responsible for the provision of Temporary Heat for the time specified herein, regardless of any delays in completion of the Project, including delays that result in the commencement of the provision of Temporary Heat during a season that is later than that which may have been originally anticipated. The Contractor for HVAC Work shall include in its Total Bid Price all expenses in connection with the provision of Temporary Heat in accordance with the requirements specified herein.
2. The total Contract duration is set forth in consecutive calendar days in Schedule A of the General Conditions. The Table set forth below indicates the number of full heating seasons that are deemed included in various contract durations, which are specified in consecutive calendar days (ccds). At a minimum, a full heating season shall extend from October 15<sup>th</sup> to April 15<sup>th</sup>.

Contract Duration	Full Heating Seasons Required
up to 360 ccds	1 full heating season
360 to 720 ccds	2 full heating seasons
more than 720 ccds	3 full heating seasons

E. METHOD OF TEMPORARY HEAT

1. The method of temporary heat shall be in conformance with all applicable laws, rules and regulations. Prior to implementation, such method shall be subject to the written approval of the Commissioner.
2. The method of temporary heat shall:
  - a. Not cause the deposition of dirt or smudges upon any finished work or cause any defacement or discoloration to the finished work.
  - b. Not be injurious or harmful to people or materials.
3. No open fires will be permitted.
4. Electric heating will not be permitted unless required by Contract Documents and Specifications or otherwise approved by the Commissioner.
5. Direct-fired equipment will be allowed in construction areas where the use of such equipment will not damage or deteriorate the construction or finishes or be harmful to persons working in the area.

F. TEMPORARY HEATING SYSTEM

1. The temporary system for the provision of Temporary Heat provided by the Contractor for HVAC

Work following enclosure of the building shall be complete including, but not limited to, torpedo blowers and/or propane heaters subject to provisions of paragraph E above), boilers and fuel storage, pumps, radiators, unit heaters, water and heating piping, insulation and controls. The temporary system for the provision of Temporary Heat shall be capable of maintaining the minimum temperature requirements set forth in Paragraph C above.

**G. THE CONTRACTOR FOR GENERAL CONSTRUCTION WORK**

1. The Contractor for General Construction Work shall coordinate with the Contractor for HVAC Work in the work of providing Temporary Heat, and shall so coordinate its operations as to insure sufficient and timely performance of the work under all Contracts. The Contractor for General Construction Work shall supply and pay for all water required and used in the building for the operation of the heating system(s) for the purpose of Temporary Heat. The Contractor for General Construction Work shall include all expenses in connection with the supply of water for Temporary Heat in its Total Bid Price. During the period in which Temporary Heat in an enclosed building is being furnished and maintained by the Contractor for HVAC Work, the Contractor for General Construction Work shall, in order to provide proper ventilating and drying, open and close the windows and other openings when necessary for the proper execution of the work and also when directed by DDC. The Contractor for General Construction Work shall maintain all permanent or temporary enclosures at its own expense.

**H. THE CONTRACTOR FOR HVAC WORK**

1. Use of Permanent Heating System for Temporary Heat after Building Enclosure
  - a. The Contractor for HVAC Work shall provide all labor and materials to promptly furnish and set all required equipment and convectors and/or radiators, piping, valves, fitting, etc., in ample time for their use for the provision of Temporary Heat after enclosure of the building.
  - b. New portions of the permanent heating system that are used for furnishing Temporary Heat shall be left in near perfect condition when delivered to the City for operation. Any repairs required, other than for ordinary wear and tear on the equipment, shall be made by the Contractor for HVAC Work at his expense. The starting date for the warranty or guarantee period for such equipment shall be the date of Substantial Completion acceptance.
  - c. In the event that the Contractor for HVAC Work does not advance the installation of the permanent heating system in sufficient time to permit its use for Temporary Heat as determined by DDC, the Contractor for HVAC Work shall furnish and install a separate system for the provision of Temporary Heat as required to maintain the minimum temperature requirements set forth in Paragraph C above.
2. All equipment for the system for the provision of Temporary Heat shall be placed so as to comply with the requirements specified hereinbefore, and shall be connected, disconnected and suitably supported and located so as to permit construction work, including finish work such as wall plastering and painting, to proceed. The installation of the system for the provision of Temporary Heat by the Contractor for HVAC Work, including the placing of ancillary system equipment, shall be coordinated with the operations of all Contractors so as to insure sufficient and timely performance of the work of all Contractors. Once the permanent heating system is operating properly, the Contractor for HVAC Work shall remove all portions of the system for Temporary Heat which are not part of the permanent heating system.
3. Temporary Heat Allowance for Special Conditions or and/or Unforeseen Circumstances.
  - a. The City has established an allowance in the Contract for HVAC Work for payment of costs and expenses in connection with the provision of Temporary Heat as set forth herein. The amount of such allowance is set forth on the Bid Form for the Contract for HVAC Work and shall be included in the Total Bid Price of the Contractor for HVAC Work. The Contractor for HVAC Work shall only be entitled to payment from this allowance under the conditions and in

accordance with the requirements set forth below. In the event this allowance or any portion thereof remains unexpended at the conclusion of the Contract, such allowance shall remain the sole property of the City. Should the amount of the allowance be insufficient to provide payment for the expenses specified below, the City will increase the amount of the allowance.

b. The allowance set forth herein may be utilized only under the conditions set forth below.

(1) In the event the Project does not involve the installation of a new permanent heating system if one did not exist previously, or the replacement, modification and/or shut down of the existing permanent heating system, or any key component thereof, and the Commissioner determines that the provision of Temporary Heat is necessary due to special and/or unforeseen circumstances, the Contractor for HVAC Work shall be responsible for the provision of Temporary Heat, as directed by the Commissioner. The City shall pay such Contractor for all costs for labor, material, and equipment necessary and required for the same. Payment shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall be as set forth in Paragraph (c) below.

(2) In the event that after enclosure of the building, the Commissioner determines that (i) Contractors other than the Contractor for HVAC Work have not sufficiently advanced the work of their contracts that is necessary and required to permit the Contractor for HVAC Work to use the permanent or other heating equipment for the provision of Temporary Heat, and (ii) the Contractor for HVAC Work does not bear any responsibility for such other Contractors' failure to advance the work, the City shall pay the Contractor for HVAC Work for all differential costs for labor, material, and equipment necessary and required for the provision of a substitute system(s) for the provision of Temporary Heat or portions thereof in lieu of the permanent or other systems intended for Temporary Heat. Payment shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall be as set forth in Paragraph (c) below.

(3) In the event the Commissioner determines that there is a need for maintenance of the permanent heating system by the Contractor for HVAC Work after written acceptance by the Commissioner of the work of all Contractors, and that the need for such maintenance is not the fault of the Contractor for HVAC Work, the Contractor for HVAC Work shall provide the required maintenance of the permanent heating system for the period of time directed by the Commissioner. The City shall pay the Contractor for HVAC Work for the cost of direct labor and fuel necessary and required in connection with such maintenance, excluding the cost of any foremen or other supervision. Payment shall be made in accordance with Article 26 of the Contract, except that the cost of fuel shall be as set forth in Paragraph (c) below.

c. Payment for Fuel Costs - Payment from the allowance set forth herein for the cost of fuel necessary and required to operate the system for the provision of Temporary Heat or to maintain the permanent heating system under the conditions set forth in Paragraph b above shall be limited to the direct cost of such fuel. The Contractor for HVAC Work shall not be entitled to any overhead and/or profit for such fuel costs. In order to receive payment for such fuel costs, the Contractor for HVAC Work must present original invoices for the same. DDC reserves the right to furnish the required fuel.

d. Deduction - In the event that any amount of the allowance set forth herein is expended for payment to the Contractor for HVAC Work under the circumstances set forth in Paragraph b.(2) above, the Commissioner shall deduct and retain such amount out of moneys that are due and owing hereunder to the other Contractor(s) responsible for the failure to advance the work, as determined by the Commissioner. In the event the amount expended from the allowance exceeds the total sum due and owing to such other Contractor(s), such excess shall be paid to the City by such other Contractor(s) immediately upon demand.

## I. THE CONTRACTOR FOR ELECTRICAL WORK

1. The Contractor for Electrical Work shall be responsible for providing the items set forth below and shall include all expenses in connection with such items in its Total Bid Price. The Contractor for Electrical Work shall provide such items promptly when required and shall in all respects coordinate its work with the Contractor for General Construction Work and the Contractor for HVAC Work in order to facilitate the provision of Temporary Heat by the Contractor for HVAC Work.
  - a. The Contractor for Electrical Work shall provide all labor, materials, equipment and power necessary and required to furnish and maintain any temporary or permanent electrical connections to all equipment specified to be connected as part of the work of his Contract.
  - b. The Contractor for Electrical Work shall supply and pay for all power necessary and required for the operation of the system for the provision of Temporary Heat and/or the permanent heating system used for Temporary Heat by the Contractor for HVAC Work. Such power shall be provided by the Contractor for Electrical Work for the duration the Contractor for HVAC Work is required to provide Temporary Heat, as set forth in Paragraph D above.
2. In providing the items set forth in Paragraph 1 above, the Contractor for Electrical Work is advised that labor may be required seven (7) days a week and/or during other than normal working hours for the period of time required by seasonal weather conditions.

**J. THE CONTRACTOR FOR PLUMBING WORK**

1. The Contractor for Plumbing Work shall be responsible for providing all labor, materials and equipment necessary and required to furnish and maintain all temporary or permanent connections to all equipment or plumbing outlets specified to be provided as part of the work of his Contract. The Contractor for Plumbing Work shall include all expenses in connection with such items of work in its Total Bid Price. The Contractor for Plumbing Work shall provide such items of work promptly when required and shall in all respects coordinate its work with the Contractor for General Construction Work and the Contractor for HVAC Work in order to facilitate the provision of Temporary Heat by the Contractor for HVAC Work.
2. In the event portions of the permanent plumbing equipment furnished by the Contractor for Plumbing Work as part of the work of his Contract are used for the provision of Temporary Heat by the Contractor for HVAC Work, either during construction or prior to acceptance by the City of the complete plumbing system, the Contractor for Plumbing Work shall be responsible to provide such plumbing equipment to the City in near perfect condition and shall make any repairs required, other than for ordinary wear and tear on the equipment, at his expense. The starting date for warranty and/or guarantee period for such plumbing equipment shall be the date of Substantial Completion acceptance by the City.
3. For Projects requiring the installation of new and/or modified gas service, as well as associated meter installations, the Contractor for Plumbing Work shall promptly perform all required filings and coordination with the Utility Companies in order to expedite the installation, testing, and approval of the gas service and associated meter(s).

**1.16 Scaffolding and Platforms**

- A. **CONFORMANCE:** Unless otherwise indicated, the Contractor for General Construction is responsible for providing, erecting, installing and maintaining all temporary scaffolding and platforms which shall comply with requirements of Chapter 33 (Safeguards During Construction or Demolition) of the NYC Building Code, NYC Local Law 52 of 2005, OSHA Construction Standard 1926 Subpart L, and furnishing the following items.
- B. **RESPONSIBILITY**
  1. A Jobsite Monitor who shall be a competent person, designated and employed by the contractor who has a daily presence on the site during scaffold use. This designee must possess and

maintain a valid New York City Department of Buildings supported scaffold certificate of completion. An alternate shall also be designated, in the event that the Jobsite Monitor is absent. The Jobsite Monitor shall:

- a. Verify completeness of documentation and submittals (as described below).
  - b. Verify that inspections are performed, including pull tests (see below), reports are filed and reported deficiencies are corrected.
  - c. Monitor trades using scaffold.
  - d. Limit access to scaffold areas that are tagged for non-use.
  - e. Inform trades of scaffold load limitations.
  - f. Monitor loading of decks.
  - g. Verify that any ties that are temporarily removed are properly restored in the same shift.
  - h. Verify that outriggers and planks that are moved are properly set up and secured.
  - i. Verify that all scaffold decks in use have proper access/egress.
  - j. Verify that all open sides of decks in excess of 14 inches have proper guardrails and toe-boards.
  - k. Notify appropriate parties, including but not limited to the Resident Engineer, site safety coordinator / monitor, site safety consultant, scaffold users, contractor and the scaffold engineer, of misuses, non-conformances, hazards and accidents.
  - l. Keep a log of significant actions and events connected with the scaffolding.
2. The Contractor shall be responsible for erection, maintenance and dismantling of the scaffold / shed in conformance with the New York City Building Code and OSHA requirements, contract documents and engineering specifications. The Contractor shall also be guided by generally accepted standards of scaffold industry practice as promulgated by the Scaffold Industry Association.
  3. Scaffold Engineer is a New York State licensed PE engaged by the scaffold contractor / erector and responsible to ensure that the installation design conforms to the New York City Building Code and OSHA requirements, that the design comports with the capabilities of the components and the characteristics of the site, that scaffold loads on the host building, including netting, have been properly considered and that the design documents communicate information for erectors and users.
  4. Scaffold users are trade contractors assigned to work on the scaffold. Training certificates from a New York City Department of Buildings approved training provider are mandatory. These users have the duty to become familiar with the New York City Building Code and OSHA requirements germane to users, to obey the instructions of the Jobsite Monitor and inform the Jobsite Monitor of known hazards, non-conformances or violations.

#### C. JOBSITE DOCUMENTATION AND SUBMITTALS:

1. NYC Department of Buildings permit(s) for scaffold and sidewalk sheds (as applicable) including filing applications signed and sealed by A Professional Engineer licensed in the State of New York;
2. Site logistics plan / site safety plan;
3. Installation drawing(s), design and product data to be provided for all scaffold(s) and shed(s) must include, at a minimum:
  - a. Plan(s);
  - b. Elevation(s);
  - c. Duty load designation; "standard" (150 psf live load) or "heavy duty" (300 psf live load).
  - d. Details including base support, anchors and ties;
  - e. Notes and specifications including load limits, number of planked levels, tie spacing, netting, and sequence of installation and removal.
  - f. Anchorage into sound material.
  - g. Load limits-based on pull tests;
  - h. Specifications for pull test(s), method, proof load and the number of trials;
  - i. Elevations, levels or heights, where anchorage is made into masonry;

- j. Specifications for frames, planks, screw jacks, anchors, and any other ancillary hardware;
- k. Samples for anchors, ties and netting;
- l. Sequence of operations for erection and demolition;
- m. Location plan, heights, widths, "jumps" over doorways and driveways;
- n. Specify size, maximum span and maximum spacing of headers and stringers;
- o. Specify legs, girts, braces, nailing and connections;
- p. All sidewalk sheds shall be designed, engineered, signed and sealed by a Professional Engineer licensed in the State of New York;
  - 1) Generic (not job specific) engineering drawings are satisfactory for standard sheds and arrangements.
  - 2) Special engineering is required for custom sheds, site-specific problems or non-standard arrangements.

**D. INSPECTIONS:**

1. Signed inspection reports shall be issued for each inspection and pull-test below, and shall be logged and maintained on site by the Jobsite Monitor for the duration of the project.
2. Pull testing shall be required during design, and during or post erection, where anchorage is made into masonry. The Scaffold Engineer shall specify the test method, proof load and the number of trials.
3. Sidewalk sheds shall be inspected after initial installation, major modification, or damage and thence every three months. Inspections shall be by a Scaffold Engineer for custom sheds and by a competent person employed by the Contractor for standard sheds.
4. Scaffolds shall be inspected by the Scaffold Engineer during erection, post-erection and prior to use and thence every three months. The Scaffold Engineer shall repeat inspections after major alteration/modification, damage.
5. A qualified person assigned by the Contractor shall inspect the progress of erection and dismantling, and the condition and integrity of the sidewalk sheds after high winds, major storms and at least once per month during usage.
6. A qualified person assigned by the Contractor shall inspect the progress of erection and dismantling at least weekly, and the condition and integrity of the scaffold after high winds, major storms and at least once per month during usage.
7. Scaffolds shall be inspected daily by the Jobsite Monitor or alternate prior to use by scaffold users.
8. At the completion of the project, submit all inspection documents to the Commissioner for record purposes.

**E. LADDERS AND STAIRS:** The Contractor for General Construction Work shall provide and maintain ladders or temporary stairs extending from the street to the first story, and to and from every floor and roof level of the project.

**F. ACCESS AND EXITS:** The ladders or temporary stairs shall be of acceptable size, number and location, so that proper and convenient access may be had by those required to proceed to and from all parts of the project.

**1.17 Hoists and Holstways**

**A. RESPONSIBILITY -** The Contractor for General Construction Work shall provide adequate numbers of material hoists for the most expeditious performance of all parts of its work. All other Contractors are required to provide their own facilities for the hoisting of materials under their respective Contracts. However, these Contractors may make arrangements, whenever possible, with the Contractor for General Construction Work for the use of its hoist upon such terms and conditions as it may prescribe.

- B. LOCATIONS - No hoists shall be constructed at such locations as will interfere with, or affect the construction of, floor arches, or the work of other Contractors. The hoists may be located at the exterior sides of the structure or in the courtyard and extend upward adjacent to the line of window openings. The hoists shall be located a sufficient distance from the exterior walls and be so protected as to prevent any of the permanent work from being damaged, stained or marred.
- C. ELEVATOR SHAFT - Wherever possible, one or more of the permanent elevator shafts may be used as temporary hoistways providing such use meets with the Building Code of the City of New York and the approval of the Commissioner, and providing further it entails no interference with the progress of the work of any Contractor.
- D. PROTECTION FOR INTERIOR HOISTS - All interior material hoistways shall be enclosed on each floor and shall be adequately protected with appropriate safety guards. In no event shall the protection be less than that required by law.

#### 1.18 Certificates of Approval

- A. RESPONSIBILITY - Each Contractor shall be responsible for and shall obtain all final approvals for the work installed under its Contract in the form of such certificates that are required by all governmental agencies having jurisdiction over the work of the Contract.
- B. TRANSMITTAL - All such certificates shall be forwarded to the Commissioner through the Resident Engineer before final acceptance of the work of the Contract.

#### 1.19 Acceptance Tests

- A. GOVERNMENTAL AGENCIES - All equipment and appliances furnished and installed under the Contract shall conform with the requirements of the Specifications, and shall in no event be less than that necessary to comply with the minimum requirements of the law and all of the governmental agencies having jurisdiction.
- B. NOTICE OF TEST - Whenever the Specifications and/or any governmental agency having jurisdiction requires the acceptance test, the Contractor shall give written notice to all concerned of the time when these tests will be conducted.
- C. ENERGY - The City will furnish all energy, fuel, water and light required for tests.
- D. LABOR AND MATERIALS - The Contractor shall furnish labor and all other material and instruments necessary to conduct the acceptance tests at no additional cost to the City.
- E. CERTIFICATES - The final acceptance by the Commissioner shall be contingent upon the Contractor delivering to the Commissioner all necessary certificates evidencing compliance in every respect with the requirements of the regulatory agencies having jurisdiction.
- F. RESULTS - If the results of tests and Controlled Inspections indicate that the material or procedures do not meet requirements as set forth on the Contract Drawings or in the Specifications or are otherwise unsatisfactory, the Contractor shall only proceed as directed by the Resident Engineer. Additional costs resulting from retesting, reinspecting, replacing of material and/or damage to the work of other trades and any delay caused to the schedule shall be borne by the Contractor.

#### 1.20 Progress Photographs (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. PHOTOGRAPHER - The Contractor for General Construction Work shall employ and pay for the services of a competent photographer who shall take photographs showing the progress of the work.
- B. PHOTOGRAPHS - There shall be four (4) photographs taken each month from the commencement of the Contract to the time of completion. These photographs shall show as far as possible, the work

completed within and on the exterior of the structure. The first series of photographs shall be taken prior to the actual commencement of work at the site. In addition thereto before final payment, there shall be six (6) photographs taken of unobstructed views of the completed project or projects and site, as directed by the Commissioner and after all scaffolding, hoists, shanties, field offices or other temporary work has been removed and final cleaning done. (For demolition work included in the Contract there shall be four (4) photographs taken before commencement of demolition operations; four (4) at the mid-point of operations; and four (4) at the completion of demolition operations). The prints shall be 8" x 10" gloss finish, mounted with a one (1) inch binding flap of muslin on the left side. They shall be marked on the back with date of exposure; the title of the project; and the specific location. Three (3) copies of each photograph shall be furnished free of charge to the Department of Design and Construction. Photographs shall be taken as ordered by the Commissioner.

#### **1.21 Job Meetings**

- A. **MEETINGS SCHEDULE** - Meetings shall be held as scheduled by the Resident Engineer in his office at the site, at which time Contractors for all separate Contracts shall have their representatives present to discuss all details relative to the execution of the work.
- B. **ACCOMODATIONS** - The Contractor for General Construction Work shall provide ample tables and chairs to accommodate all present at the meetings, and table space for Contract Drawings.
- C. **AGENDA** - The Resident Engineer shall preside over these meetings. Prior to each meeting, the Resident Engineer will consult with the Contractors and will prepare an agenda of items to be discussed. In general, after informal discussion of any item on the agenda, the Resident Engineer will summarize the discussion in a brief written statement, and each Contractor will then dictate a brief statement for the record.

The Contractor for General Construction Work shall furnish all necessary typing and printing of the minutes prepared by the Consultant Architect/Engineer. Ample copies of the printed minutes shall be furnished to the Resident Engineer for distribution to all Contractors and representatives of the Commissioner.

- D. **COORDINATION** - Job meetings shall also be called by the Contractor for General Construction Work for the purpose of coordinating, expediting and scheduling the work of all Contracts in accordance with the master coordinated Job Progress Chart. All Contractors and their subcontractors, material suppliers or vendors whose presence is necessary, are required to attend. These meetings may, at the discretion of the Contractor for General Construction Work, be held at the same place and immediately following the Job Meetings held by the Resident Engineer. Minutes of these meetings shall be recorded, typed and printed by the Contractor for General Construction Work and distributed to all parties concerned.

#### **1.22 Guarantees and Warranties - Refer to the Addendum to the General Conditions for the applicability of this article.**

- A. **SCHEDULE B** - Requirements for guarantees and warranties for the Project are set forth in Schedule B, which is included as part of the Addendum to the General Conditions.
- B. **FORM** - For all guarantee requirements set forth in Schedule B, the Contractor shall provide a written guaranty, in the form set forth on the following page.

**GUARANTY**

DDC PROJECT # \_\_\_\_\_

PROJECT DESCRIPTION \_\_\_\_\_  
\_\_\_\_\_

CONTRACT # \_\_\_\_\_

SPECIFICATION SECTION # AND TITLE \_\_\_\_\_  
\_\_\_\_\_

GUARANTY TO BE IN EFFECT FROM \_\_\_\_\_

TO \_\_\_\_\_  
\_\_\_\_\_

The Contractor hereby guarantees that the work specified under the above section of the aforesaid Contract will be free from defects of material and/or workmanship, for the period indicated above.

The Contractor also guarantees that it will promptly repair, restore, rebuild or replace whichever may be deemed necessary by the City, any or all defective material or workmanship of the aforementioned section, that may appear within the guaranty period and any finished work to which damage may occur because of such defects, to the satisfaction of the City and without any cost or expense to the City.

The Contractor hereby agrees to pay to the City the cost of the repairs or replacements should the City make the same because of the failure of the Contractor to do so.

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
By

Subscribed and sworn to before me this

day of \_\_\_\_\_, year \_\_\_\_\_

\_\_\_\_\_  
Notary Public

### 1.23 Removal of Rubbish and Surplus Materials

- A. RUBBISH - Rubbish shall not be thrown from the windows or other parts of the project. Mason's rubbish, dirt and other dust-producing material shall be wetted down periodically.
- B. LOCATION - Each Contractor shall sweep up and deposit, at a location designated on each floor by the Contractor for General Construction Work, all of its rubbish, debris and waste materials, as it accumulates and when directed by the Resident Engineer. Wood cratings shall be broken up, neatly bundled, tied and stacked ready for removal and be deposited at a location designated on each floor by the Contractor for General Construction Work.
- C. LABORERS - The Contractor for General Construction Work shall be responsible for the removal of all rubbish, etc., from the site. The Contractor shall remove from the designated locations all piles of rubbish, debris, waste material and wood cratings as they accumulate and when directed by the Resident Engineer, and shall remove them from the site. The Contractor shall employ and keep engaged for this purpose an adequate number of laborers.
- D. SURPLUS MATERIALS - Each Contractor shall remove from the site all surplus materials when there is no further use for same.
- E. TOOLS AND MATERIALS - At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly removed.

### 1.24 Cleaning

Each Contractor shall thoroughly clean all equipment and materials furnished and installed and shall deliver such materials and equipment undamaged in a clean and new appearing condition at time of substantial completion.

### 1.25 Inspections by Other City Agencies

- A. LETTER OF COMPLETION - Just prior to substantial completion of this Project, the Commissioner will file with the Department of Buildings, an application for a Letter of Completion or a Certificate of Occupancy for the structure.
- B. FINAL INSPECTIONS - In connection with the above mentioned application for a Letter of Completion or a Certificate of Occupancy and before certificates of final payments are issued, each Contractor will be required to arrange for all final inspections by the inspectional staff of the Department of Buildings or other governmental agencies having jurisdiction, and secure all reports, sign offs, certificates, etc., by such inspection staff or other governmental agencies, in order that a Letter of Completion or Certificate of Occupancy can be issued promptly.

### 1.26 Security Guards/Fire Guards on the Site (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

#### A. SECURITY GUARDS (WATCHMEN)

1. The Contractor for General Construction Work shall provide competent Security Guards on the site until final completion of the project or earlier if so notified in writing by the Commissioner. The Security Service shall commence with the start of work. There shall be no less than one (1) Security Guard on duty every day, including Saturdays, Sunday and Holidays, 24 hours a day, except between the hours of 8:00 A.M. and 4:00 P.M. on any day which is a regular working day for a majority of the trades. This exception during the working day shall not apply after the finishing painting of the plaster work is commenced; thereafter, not less than one (1) Security Guard shall be on duty continuously, 24 hours a day, until final completion of the project or earlier if so notified in writing by the Commissioner.

2. Every Security Guard shall be required to hold a "Certificate of Fitness" issued by the Fire Department. Every Security Guard shall, during their tour of duty, perform the duties of Fire Guard in addition to their security obligations.
  3. Should the Commissioner find that any Security Guard is unsatisfactory, such guard shall be replaced by the Contractor for General Construction Work upon the written demand of the Commissioner.
  4. Each Security Guard furnished by the Contractor for General Construction Work shall be instructed by the Contractor for General Construction Work to include in their duties the entire construction site including the Field Office, temporary structures, and equipment, materials, etc.
  5. Should the Contractor for General Construction Work or any other Contractor consider the security requirements outlined above inadequate, it shall provide such additional security as it thinks necessary, after obtaining the written consent of the Commissioner. The additional cost of such approved increased protection will be paid by the Contractor who provides the additional protection.
  6. Nothing contained in this Article shall diminish in any way the responsibility of each Contractor for its own work, materials, tools, equipment, nor for any of the other risks and obligations outlined hereinbefore in this Article.
- B. **COSTS** - The Contractor for General Construction Work shall employ Security Guards/Fire Guards at all times, except as otherwise modified by the detailed Specifications and as approved by the Commissioner, for the purpose of safeguarding and protecting the site. All costs for Security Guards/Fire Guards shall be borne by the Contractor for General Construction Work.
- C. **RESPONSIBILITY** - All Contractors will be responsible for safeguarding and protecting their own work, materials, tools and equipment.

#### **1.27 Contractor's Daily Reports**

- A. **DAILY REPORTS** - As soon as the Contractor has started work on the Project, it shall submit to the Resident Engineer written daily reports of the work performed the previous day by any of its employees, including the employees of its subcontractors.
- B. **INFORMATION** - The reports shall be prepared by the Contractor's Superintendent and shall bear the Contractor's Superintendent signature. Each report shall contain the following information:
1. The type of materials and/or major equipment being installed by the Contractor and the total number of employees working in each category on that particular day.
  2. The names of the subcontractors working and the type of materials and/or major equipment being installed by each, together with the total number of employees working for each subcontractor on that particular day.
  3. The major construction equipment being used by each Contractor and/or subcontractor.

#### **1.28 Alternate or Substitute Equipment**

- A. In general, the Contract Drawings and Specifications show and describe arrangements suitable for the specific items of equipment either named or described. In the event that a Contractor submits for approval, and receives such approval, a device or piece of equipment which requires connections (vacuum, gas, steam, water, air, electric, etc.) or arrangements of these services, differing from those indicated or described in the Contract Documents, it shall be incumbent upon the Contractor submitting the alternate or substitute equipment to give timely notice to the other Contractors involved so that they may make suitable alterations in the work to accommodate the substitute or alternate equipment. The Contractor making the substitution shall be responsible for any and all additional

costs incurred by any of the Contractors by virtue of the substitution of equipment for the equipment named or described in the Contract Documents.

**1.29 Sleeve and Penetration Drawings (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. As soon as practicable after the commencement of work and when the order in which concrete for the first slabs, walls, etc. to be poured is determined, the Contractors for the engineering trades (Plumbing, Heating, Ventilating and Air Conditioning, and Electrical) shall submit to the Department of Design and Construction a sketch indicating the location and size of all penetrations for sleeves, ducts, etc. which will be required to accommodate the mechanical trades, in order that it may be determined if such penetrations will materially weaken the project's structure. The sketch will be stamped and returned if approved and/or comments will be transmitted. The engineering Contractors shall continue to submit sketches as the pouring schedule and the concrete work progresses and, until approvals for the penetration sketches have been given, shall not predicate their layout work on unapproved sketches.

**1.30 Location of Partitions (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. Within three (3) weeks after the concrete slabs have been poured on each floor level, the Contractor for General Construction Work shall immediately locate accurately all of the partitions, including the door openings, on the floor slabs in a manner approved by the Resident Engineer.

**1.31 Furniture and Equipment**

- A. **RESPONSIBILITY** - Each Contractor is responsible for moving all loose furniture and/or equipment in all areas when such furniture and/or equipment interferes with the proper performance of its work.
- B. **PROTECTION** - All such furniture and/or equipment must be adequately protected with dust cloths and returned to their original locations when directed to do so by the Resident Engineer.

**1.32 Overtime Work (Ordered by Commissioner)**

- A. **OVERTIME** - The Commissioner reserves right to order and pay for overtime work.
1. The Commissioner can order overtime work when in the Commissioner's opinion, delay occurs and such delay is not the fault of the Contractor, or
  2. When work is of such an important nature that delay in carrying such work to completion would result in serious disadvantage to the public.
- B. **ORDER FOR OVERTIME WORK** - When overtime work is ordered by the Commissioner, such "Order" will be issued by the Commissioner on a special form letter over the signature of the Commissioner.
- C. **CONTRACTOR'S PROCEDURE PRIOR TO COMMENCING WORK**
1. Make immediate application to the Commissioner of Department of Labor, State of New York, for dispensation in accordance with Subdivision 2 of Section 220 of the Labor Law.
  2. Upon receipt of such dispensation, proceed expeditiously with ordered overtime work.

**1.33 Compliance with OSHA Regulations**

These Contract Documents and the work hereby contemplated shall be governed, at all times, by the following Federal Laws:

- A. William Steiger Occupational Safety and Health Act of 1970, Public Law 91-596;

- B. Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;
- C. Part 1926 - Safety and Health Regulations for Construction, Chapter XVII of Title 29, Code of Federal Regulations.

### 1.34 Temporary Services

#### PART A (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)

- A. TEMPORARY WATER - during construction shall be furnished in the following manner:
  - 1. Immediately after the Contractor for General Construction Work has been ordered by the Commissioner to start work, it shall file an application with the Dept. of Environmental Protection for the schedule of charges for water use during construction. The Contractor for General Construction Work will be responsible for payment of water charges.
  - 2. Immediately after the Contractor for Plumbing Work has been ordered by the Commissioner to start work, it shall file an application with the Department of Environmental Protection's Bureau of Water Supply and obtain its permit to install the temporary water supply system. The system shall be installed and maintained for the use of all Contractors. A copy of the above mentioned permit shall be filed with the Commissioner. The Contractor for Plumbing Work shall provide temporary water main, risers and waste stacks as directed and install on each floor, outlets with two (2) 3/4" hose valve connections over a barrel installed on a steel pan. The Contractor for Plumbing Work shall provide drains from the pans to the stack and house sewer and hose bibs to drain the water supply risers and mains. During winter months the Contractor for Plumbing Work shall take the necessary precautions to prevent the temporary systems from freezing.
- B. TOILET FACILITIES - both exterior and interior, for the use of all Contractors, shall be furnished and installed in the following manner:
  - 1. Toilet fixtures shall be furnished, installed and maintained in a satisfactory operating condition by the Contractor for Plumbing Work.
  - 2. Enclosures for the toilet fixtures shall be erected and maintained by the Contractor for General Construction Work.
  - 3. Heating for the enclosures shall be furnished, installed and maintained by the Contractor for General Construction Work.
  - 4. Electric lighting for the enclosures shall be furnished, installed and maintained by the Contractor for Electrical Work.
  - 5. The Contractor for General Construction Work shall keep the temporary toilet fixtures and enclosures in a clean and sanitary manner.
  - 6. No Contractor shall cause any sanitary nuisances to be committed by its employees in or about the work. Each Contractor shall enforce all sanitary regulations of the City and State Health Authorities.
- C. OVERTIME USE - Whenever any Contractor(s) work before or after the regular work hours hereinafter specified under Subparagraph D, or on a Saturday, Sunday or Holiday of any trade, such Contractor(s) shall pay the Contractor for Plumbing Work for the activation of the temporary water system and toilet facility services during such overtime periods. When more than one (1) Contractor is involved in overtime work, the costs thereof shall be prorated as determined by the Resident Engineer. When overtime is required by any or all Contractors on the work, the provisions for payment for regular time use of the temporary water supply system as specified in Subparagraph D shall apply.

- D. **ACTIVATION** - The Contractor for Plumbing Work shall bear the cost of keeping the temporary water supply system activated from a period of time 15 minutes before the established starting time of that trade which starts work earliest in the morning, to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week which is established as a regular working day for aforementioned trades and holds until completion and final acceptance of the work of the Contractor for Plumbing Work or until the services are terminated by instructions from the Commissioner.

**PART B (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. **WATER** - The Contractor for General Construction Work will be responsible for payment of water charges. Billing will be in accordance with the Department of Environmental Protection schedule of charges for Building Purposes.
- B. **ELECTRICITY** - for temporary light and the operation of small tools, is available in the area of this project and will be furnished to the Contractor for General Construction Work by the Contractor for Electrical Work without cost.
- C. **TOILET FACILITIES** - The Contractor for General Construction Work shall arrange with the Commissioner for the temporary use of certain toilets or washrooms within the project for the use of all employees during the execution of the work.
- D. **MAINTENANCE** - The Contractor for General Construction Work shall maintain the temporary toilet facilities in a clean and sanitary manner and make all necessary repairs due to misuse.
- E. **NUISANCES** - The Contractors shall not cause any sanitary nuisance to be committed by its employees in or about the work, and shall enforce all sanitary regulations of the City and State Health Authorities.

**1.35 Temporary Use, Operation and Maintenance of Elevators during Construction**

**PART A - FOR NEW BUILDINGS UP TO AND INCLUDING 15 STORIES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. **INSTALLATION** - The Contractor for General Construction Work shall install and complete, as indicated herein, one (1) selected main elevator in the Project for temporary operation by the Contractor for General Construction Work for the transporting of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction of work at the project. The Contractor for General Construction Work shall furnish, install and maintain for such elevators, all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices, and all other permanent or temporary parts. The installation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- B. **RESPONSIBILITY** - The Contractor for General Construction shall be responsible for any injury to persons or damage to property arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of the temporary elevator or parts utilized in connection therewith, if required.

- C. **ACTIVATION TIME** - The Contractor for General Construction Work shall keep the temporary elevator activated from a period of time 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.
- D. **COMMENCEMENT OF SERVICE** - The Contractor for General Construction Work shall begin to provide temporary elevator service using the selected main passenger elevator no later than eight (8) weeks (40 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed. No later than three (3) weeks (15 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed the following work shall have been completed:
1. The shaft shall have been completely enclosed by either the permanent or a temporary enclosure meeting the requirements of the law.
  2. The machine room shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
  3. There shall have been installed on all floors at the shaftway entrances to the elevator, solid substantial frames and either sliding or swing doors with substantial hardware and door locks and any necessary approved wire mesh barricades for adjacent shaftways.
  4. There shall have been furnished and installed solid substantial enclosures at front, back, sides and top of car platform enclosure, with emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- E. **ELECTRICAL INSTALLATION** - The Contractor for Electrical Work, not later than 20 calendar days after the machine room roof slab or that portion of its surrounding the elevator has been placed, shall have furnished and installed temporary or permanent power and light feeders as required for the elevator used for temporary service and shall have connected such feeders to the terminals on the starter panels or controllers in the machine room to the low voltage transformers and car light outlets in the center of shaftway and for the car control and signal traveling cables. The Contractor for Electrical Work shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- F. **REMOVAL** - When elevators for permanent use have been installed and are in condition for service, and when directed by the Commissioner, the Contractor for General Construction Work shall remove the temporary enclosures and all temporary elevator equipment and promptly proceed with the installation of the permanent equipment as is required under the Contract.
- G. **INSPECTION** - Before temporary elevator equipment has been removed, a joint inspection of the equipment shall be made by the Contractor for General Construction Work and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection deems it necessary, the Contractor for General Construction Work shall furnish and install new governor and compensating ropes, new traveling cables and new controller parts, etc. The car and counterweight safeties shall be thoroughly cleaned of all dirt and all foreign matter, then properly lubricated and placed in good operating condition to the satisfaction of the Commissioner. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes shall be installed and payment therefor will be made in accordance with Article 26 of the Contract.
- H. **REPLACEMENT** - The Contractor for General Construction Work shall replace with new, any of the equipment or parts of the temporary elevator installation that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheave spaces used for temporary operation of elevators shall be thoroughly

cleaned. Where lubricated rails are used they shall be washed down. If roller guides are used, all rust, dirt, etc., must be moved from the rails. The full cost of parts replacement, cleaning, etc., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.

- I. COSTS - The Contractor for Electrical Work shall pay the costs of all electrical current used for operating the temporary elevators. The Contractor for General Construction Work shall provide all necessary conduit and wiring connections for the proper operation of the elevator and the signaling of the temporary elevators.
- J. LIMITATIONS OF USE - The temporary elevator shall not be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representatives of City Departments and other Governmental Agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specified times to the various Contractors to hoist materials, which in the Resident Engineer's opinion will not overload or damage the elevator installation, but only after such times as all plastering has been completed from the second floor up. The particular Contractor using the elevator for the hoisting of its material shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall give notification in writing to the Resident Engineer of any alleged damage to the elevator installation within 24 hours after the elevator has been employed for the hoisting of materials by the particular Contractor(s).
- K. PAYMENT FOR USE - The Contractor for General Construction Work shall be paid for its operation and maintenance of the temporary elevator or permanent elevator used for temporary service at the daily rate indicated under the Item of its Contract. All other costs in connection with the elevator installation and equipment, excepting electrical work done by the Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- L. LIQUIDATED DAMAGES - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide the temporary elevator service described in this section beginning with the 41<sup>st</sup> working day after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor for General Construction Work.
- M. OVERTIME USE - All Contracts. Whenever any Contractor or Contractors work before or after the regular work hours as indicated in Paragraph B above, or on a Saturday, Sunday or Holiday, such Contractor or Contractors shall pay the Contractor for General Construction Work for the operation and maintenance of the temporary elevator, if required by such Contractor or Contractors, at the daily rate indicated in the Contract but increased to reflect the difference between regular wage rates and overtime wage rates. The basic hourly charge shall be considered as one ninth (1/9) of the amount shown in the Item of the Bid form of the General Construction Work Contract. The City will not pay any Contractor for such overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

**PART B - FOR NEW BUILDINGS OVER 15 STORIES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. INSTALLATION - The Contractor for General Construction Work shall install and complete, as indicated herein, two (2) selected main elevators in the Project for temporary operation by the Contractor for General Construction Work for the transporting of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction over work at the project. The Contractor for General Construction Work shall furnish, install and maintain for such elevators, all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices, temporary hand reset target annunciators, temporary signal devices and all other permanent or temporary parts. The installation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use. The two (2) elevators will not be operated simultaneously.

- B. **RESPONSIBILITY** - The Contractor for General Construction shall be responsible for any injury to persons or damage to property arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of the temporary elevator or parts utilized in connection therewith, if required.
- C. **ACTIVATION TIME** - The Contractor for General Construction Work shall keep the temporary elevator activated from a period of time 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.
- D. **LOW RISE ELEVATOR** - The Contractor for General Construction Work shall begin to provide temporary elevator service using one (1) selected main passenger elevator no later than six (6) weeks (30 working days) after the 12th Floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped. No later than one (1) week, five (5) working days, after the 12th Floor slab, or that portion of it surrounding the elevator shaft, has been placed and stripped the following work shall have been completed:
1. The shaft shall have been completely enclosed up to the 12th Floor by either the permanent or a temporary enclosure meeting the requirements of the law.
  2. A temporary machine room enclosure shall have been provided at the 11th Floor and shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary, shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
  3. There shall have been installed on all floors up to and including the 9th Floor at the shaft entrances to the elevator, solid substantial wood frames and either sliding or swing doors with substantial hardware and door locks, also any necessary approved wire mesh barricades for adjacent shaftways.
  4. There shall have been furnished and installed solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- E. **ELECTRICAL INSTALLATION** - The Contractor for Electrical Work, not later than 10 calendar days after the 12th Floor slab or that portion of it surrounding the elevator, has been poured and stripped, shall have furnished and installed temporary or permanent power and light feeders as required for the elevator used for temporary service and shall have connected such feeders to the terminals on the starter panels or controllers in the temporary machine room, to the low voltage transformers and car light outlets in the center of the shaftway and for the car control and signal traveling cables. The Contractor for Electrical Work shall make all these required connections as soon as the Equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- F. **HIGH RISE ELEVATOR** - The Contractor for General Construction Work shall begin to provide temporary elevator service to all floors, using a selected main passenger elevator, no later than eight (8) weeks (40 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed. No later than three (3) weeks (15 working days) after the machine room roof slab, or that portion of it surrounding the elevator shaft, has been placed, the following work shall have been completed:

1. The shaft shall have been completely enclosed by either the permanent or temporary enclosure, meeting the requirements of the law.
  2. The machine room shall have been made completely watertight either by permanent or temporary construction. Beams or other devices, either permanent or temporary shall be provided which will enable the safe and practicable hoisting of the elevator machinery for installation.
  3. There shall have been installed on all floors at the shaftway entrances to the elevator, solid substantial frames and either sliding or swing doors with substantial hardware and door locks, also any necessary approved wire mesh barricades for adjacent shaftways.
  4. There shall have been furnished and installed, solid substantial enclosures at front, back, sides and top of car platform enclosure, with an emergency exit at top of car, excepting that the portion of the front at the elevator entrance shall have been provided with a substantial temporary door or gate.
- G. The Contractor for Electrical Work, not later than 20 calendar days after the machine room slab or that portion of it surrounding the elevator shaft has been placed, shall have furnished and installed temporary or permanent power and light feeders as required for the high rise elevator to be used for temporary service and shall have connected such feeders to the terminals on the motor-generator starter panels or controllers in the machine room, to the signal circuits low voltage transformers for the annunciators and car light outlets in the center of shaftway.
- The Contractor for Electrical Work shall make all these required connections as soon as the equipment is declared ready for such connections by the Resident Engineer. The cost of this work shall be included in the Contractor for Electrical Work's Contract.
- H. When the high rise elevator is completed and ready for temporary operation, the low rise temporary elevator shall be shut down.
- I. When one (1) or more elevators for permanent use have been installed and are in condition for service, and when directed by the Commissioner, the Contractor for General Construction Work shall remove the temporary enclosures and all temporary elevator equipment, and promptly proceed with the installation of the permanent equipment as is required under the Contract.
- J. Before temporary elevator equipment has been removed, a joint inspection of the equipment shall be made by the Contractor for General Construction Work and the Commissioner to determine the condition of this equipment upon the discontinuation of its temporary use. If this inspection determines it necessary, the Contractor for General Construction Work shall furnish and install new governor and compensating ropes, new traveling cables, new controller parts, etc. The car and counterweight safeties shall be thoroughly cleaned of all dirt and all foreign matter, then properly lubricated and placed in good operating condition to the satisfaction of the Commissioner. If it is determined and ordered by the Commissioner that new hoist ropes are required, such ropes shall be installed and payment therefor will be made in accordance with Article 26 of the Contract.
- K. The Contractor for General Construction Work shall replace with new, any of the equipment or parts of the temporary elevator installations that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheaves spaces used for temporary operation of elevators shall be thoroughly cleaned down. Where lubricated rails are used they shall be washed down, if roller guides are used, all rust, dirt, etc., must be removed from the rails. The full cost of parts replacement cleaning, etc., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.
- L. The Contractor for Electrical Work shall pay the costs of all electrical current used for operating the temporary elevators. The Contractor for General Construction Work shall provide all necessary conduits and wiring connections for the proper operation of the elevators and the signaling of the temporary elevators.

- M. No temporary elevator shall be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representatives of City Departments and other governmental agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specific times to the various Contractors to hoist materials which, in the Resident Engineer's opinion, will not overload or damage the elevator installation, but only after such time as all plastering has been completed from the second floor up. The particular Contractor using the elevator for the hoisting of its material shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall give notification in writing to the Resident Engineer of any alleged damage to the elevator installation within 24 hours after the elevator has been employed for the hoisting of materials by the other Contractors.
- N. The Contractor for General Construction Work shall be paid for its operation and maintenance of each temporary elevator or permanent elevator used for temporary service at the daily rate indicated under the item of its Contract. All other costs in connection with elevator installation and equipment, excepting Electrical Work done by the Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- O. LIQUIDATED DAMAGES - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide the temporary elevator service described in this Section beginning with the 31st working day after the 12th Floor slab, or that portion of the 12th Floor slab surrounding the elevator shaft, has been placed and stripped. This charge will be deducted from any amount due and owing to the Contractor for General Construction Work.
- P. OVERTIME USE - ALL CONTRACTS. Whenever any Contractor(s) work before or after the regular work hours as indicated in Subparagraph B above, or on a Saturday, Sunday or Holiday, such Contractor or Contractors shall pay the Contractor for General Construction Work for the operation and maintenance of the temporary elevator, if required by such Contractor or Contractors, at the rate indicated in the Item of the bid form of the General Construction Work Contract but increased to reflect the difference between regular wage rates and overtime wage rates. The basic hourly charge shall be considered as one ninth (1/9) of the amount shown in the item of the General Construction Work Contract. The City will not pay any Contractor for such overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

**PART C - EXISTING BUILDINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. The Contractor for General Construction Work may use, at the Commissioner's discretion, one (1) selected elevator in the project for temporary operation by the General Construction Work Contractor for the transportation of employees of all Contractors and representatives of the Department of Design and Construction and other Governmental Agencies having jurisdiction over work at the Project. The Contractor for General Construction Work shall maintain for such elevators, all necessary hoisting ropes, governor cables, traveling conductor cables, operating devices hand reset target annunciators, signal devices, and all other permanent or temporary parts. The installation and maintenance of the temporary elevator and all equipment and/or parts utilized in connection therewith shall be in accordance with the rules and regulations of all agencies and/or entities having jurisdiction over elevators in temporary use.
- B. The Contractor for General Construction shall be responsible for any injury to persons or damage to property arising out of the temporary elevator and all equipment and/or parts utilized in connection therewith. The Contractor for General Construction shall employ and pay wages, including overtime wages if necessary, for all workers required for the operation and maintenance of the temporary elevator. The Contractor for General Construction shall be responsible for all costs for: (1) the installation of the temporary elevator, (2) maintaining the temporary elevator in clean, proper operating condition, including the cost of lubricants and/or parts for such maintenance, (3) all work in pits, shaftways and machine rooms necessary for the operation of the elevator, and (4) the replacement of

the temporary elevator or parts utilized in connection therewith, if required.

- C. The Contractor for General Construction Work shall keep the temporary elevator activated from a period of time of 15 minutes before the established starting time of that trade which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week, which is established as a regular working day for the aforementioned trades.
- D. The Contractor for General Construction Work shall replace with new any of the equipment or parts of the elevator for temporary operation installation that were damaged, destroyed, or that indicate excessive wear or corrosion excepting the replacement of hoisting ropes. All shaftways, pits, motor rooms and sheave spaces used for temporary operation of elevators shall be thoroughly cleaned down. Where lubricated rails are used they shall be washed down, if roller guides are used, all rust, dirt, etc., must be moved from the rails. The full cost of parts replacement, cleaning, etc., shall be borne by the Contractor for General Construction Work except for the replacement of hoisting ropes.
- E. The elevator for temporary operations shall be used during its operation for hoisting of materials or removal of rubbish, but shall be limited only to the transportation of employees of all Contractors and the representative of City Departments and other Governmental Agencies having jurisdiction of work at the project. However, the Resident Engineer may grant special permission at specified times to the various Contractors to hoist materials which, in the Resident Engineer's opinion, will not overload or damage the elevator installation. The particular Contractor using the elevator for the hoisting of its material shall be responsible for any damage to the elevator during the entire period of such use. The Contractor for General Construction Work shall give notification in writing to the Resident Engineer of any alleged employed for the hoisting of materials by the particular Contractor(s).
- F. The Contractor for General Construction Work shall pay all costs for the operation and maintenance of the elevator for temporary operation. All other costs in connection with the elevator and equipment excepting electrical work done by the Contractor for Electrical Work under its Contract, shall be included in the Contractor for General Construction Work's Contract.
- G. **LIQUIDATED DAMAGES** - The Contractor for General Construction Work will be charged at the rate of \$100 per day for each day it fails to provide elevator services described in this section beginning with 15 consecutive calendar days from notice to proceed. This charge will be deducted from any amount due and owing to the Contractor for General Construction Work.
- H. **OVERTIME USE - ALL CONTRACTS** - Whenever any Contractor(s) work before or after the regular work hours as indicated in Paragraph B above, or on a Saturday, Sunday or Holiday, such Contractor(s) shall pay the Contractor for General Construction Work for the operation and maintenance of the elevator, if required by such Contractor(s) at the union daily rates but increased to reflect the difference between regular wage rates and overtime wage rates. The City will not pay any Contractor for overtime use of the elevator. When more than one (1) Contractor is involved in the overtime work, the charges shall be prorated as determined by the Resident Engineer unless otherwise agreed mutually among all the Contractors involved.

**1.36 General Mechanical Requirements (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. The General Mechanical Requirements contained herein shall be followed by all Contractors furnishing mechanical equipment under their respective Contracts.
- B. **CONCEALED PIPING** - and ducts shall mean piping and ducts hidden from sight in masonry or other construction, in floor fill, trenches, partitions, hung ceilings, furred spaces, pipe shafts and in service tunnels not used for passage. Where piping and ducts run in areas that have hung ceilings, such piping and ducts shall be installed in the hung ceilings.
- C. **THE CONTRACT DRAWINGS** - are in part diagrammatic and show the general arrangement of the equipment, ducts and piping included in the Contract and the approximate size and location of the

equipment. The Contractor shall follow these Contract Drawings in laying out the work and shall consult the Contract Drawings of the other Contracts to become familiar with all conditions affecting it and to verify the spaces in which it will be installed. The Contractor shall cooperate with the Public Utilities doing certain necessary work for this project. The attention of the Contractor is called to the Contract Drawings for General Construction Work for the location, arrangement and extent of plumbing and other fixtures and equipment. All work shall be installed in locations as shown on these Contract Drawings.

- D. **CERTIFICATES** - On completion of the work, the Contractor shall obtain certificates of inspection, approval, acceptance and of compliance with all laws from all agencies and/or entities having jurisdiction over the work and shall deliver these certificates to the Commissioner. The work shall not be deemed substantially complete until the certificates have been delivered.
- E. **SHOP DRAWING SUBMITTALS** - Contractors doing mechanical work shall submit, as directed, Shop Drawings, roughing drawings, manufacturer's Shop Drawings, field drawings, cuts, bulletins, etc., of all materials, equipment and methods of installation shown or specified.
1. Submit sheet metal shop standards. Submit manufacturer's product data including gauges, materials, types of joints, scaling materials and installations for metal ductwork materials and products.
  2. Submit scaled layout drawing (3/8"=1') of metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, slopes of horizontal runs, wall and floor penetrations and connections. Show modifications of indicated requirements made to conform to local shop practice and how those modifications ensure that free area, materials and rigidity are not reduced. Layouts should include all the room plans, mechanical equipment rooms and penthouses. Method of attachment of duct hangers to building construction all with the support details. Coordinate shop drawings with related trades prior to submission.
  3. Indicate duct fittings, particulars such as gauges, sizes, welds and configuration prior to start of work for low-pressure systems.
  4. Submit maintenance data and parts lists for metal ductwork materials and products. Include this data, product data and shop drawings in maintenance manual.
- F. **ACCESSIBILITY** - All work shall be installed by the Contractor so as to be readily accessible for inspection, operation, maintenance and repair. Minor deviations from the arrangement indicated on the Contract Drawings may be made to accomplish this, but they shall not be made without approval by the Commissioner.
- G. **CHANGES IN PIPING, DUCTS, AND EQUIPMENT** - Wherever field conditions are such that for proper execution of the work, reasonable changes in location of piping, ducts and equipment are necessary and required, the Contractor shall make such changes as directed and approved, without extra cost to the City.
- H. **CLEANING OF PIPING, DUCTS, AND EQUIPMENT** - Piping, ducts and equipment shall be thoroughly cleaned by the Contractor of all dirt, cuttings and other foreign substances. Should any pipe, duct or other part of the several systems be obstructed by any foreign matter, the Contractor will be required to pay for disconnecting, cleaning and reconnecting wherever necessary for the purpose of locating and removing obstructions. The Contractor shall pay for repairs to other work damaged in the course of removing obstructions.
- I. **STANDARDIZATION OF SIMILAR EQUIPMENT** - Unless otherwise particularly specified, all equipment of the same kind, type or classification, and used for identical purposes, shall be the product of one (1) manufacturer.
- J. **MACHINERY PARTS** - shall conform exactly to the dimensions shown on the Contract Drawings. The equivalent parts of identical machines shall be identical so that they can be interchangeable.

- K. **FITTINGS** - All grease lubricating fittings on equipment shall be of a uniform type and shall be readily accessible and types proposed to be used shall be submitted for approval.
- L. **GUARDS** - All machinery shall be designed with protecting guards conforming with the requirements of the Industrial Code of the New York State Department of Labor or OSHA, whichever is stricter.
- M. **LIMIT SWITCHES** - Unless otherwise specified, limit switches and other mechanically actuated switches shall be enclosed in tight metal boxes and be installed in the proper locations ready for conduit connections. Switches shall be complete with all supports, stops, cams, arms, tripping and operating members, which shall be adjustable where required for proper functioning.
- N. **ANCHORS, BOLTS, ETC. AND FOUNDATIONS** - Unless otherwise specified, the Contractor shall furnish the necessary anchors, bolts, guides, track rails, bearing plates, substantial templates and all other appurtenances, and build the necessary foundations, as approved by the Commissioner, for all equipment supplied by the Contractor under its Contract.
- O. **EQUIPMENT DESIGN** - Equipment and appurtenances shall be designed in conformity with ASME and AIEE standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operations. Adequate stays, braces and anchors shall be provided. All bearings and moving parts shall be adequately protected against wear by bushings, or other approved means, and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers and the like shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.
- P. **SUPPORTING STRUCTURES DESIGNED BY THE CONTRACTOR** - Unless otherwise specified, supporting structures for equipment to be furnished by the Contractor shall be designed and built by the Contractor of sufficient strength to safely withstand all stresses to which they may be subjected, within permissible deflections, and shall meet the following standards:
1. Structural Steel - ASTM Standard Specifications, AISC and NYBC.
  2. Concrete for supports for equipment shall conform to the Specifications for concrete herein, but in no case shall be less than the requirements of the NYBC for average concrete.
  3. Steel reinforcement for concrete shall be of intermediate grade and shall meet the requirements of the Standard Specifications for Billet Steel-Concrete Reinforcement Bars, ASTM.
- Q. **ENGINEER'S ASSUMED DESIGN DATA** - All structural steel, concrete and reinforcement indicated or specified to support the equipment or appurtenances and the area immediately adjacent thereto have been designed from data based on assumed average anticipated clearances and loading. The final structural design in these locations will be based on definite data received from the Contractor after the Commissioner approves the equipment and appurtenances to be installed. The Commissioner will then redesign, if necessary, the supporting structure to properly support and maintain the approved equipment and appurtenances. Necessary major changes in design will be covered by Supplementary Drawings that will be furnished to the Contractor. All changes indicated or necessary to accommodate the equipment and appurtenances, shall be incorporated into the Working Drawings submitted for approval, and the cost of furnishing and installing the work necessitated by these changes shall be borne by the Contractor furnishing the equipment.
- R. **INSTALLATION OF EQUIPMENT** - Equipment shall be erected in a neat and workmanlike manner on the foundations, at the locations and elevations shown on the Contract Drawings or as required. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between various units and with piping and equipment that may be installed under other Contracts. When required by the Specifications, the Contractor shall obtain the assistance of a competent and experienced Engineer or Superintendent, in the employ of the manufacturer, to install the equipment.

S. **ELIMINATION OF NOISE** - All work provided under the Contract shall operate without objectionable noise or vibration.

1. Should operation of any one or more of the several systems produce noise or vibration which is, in the opinion of the Commissioner, objectionable, the Contractor shall at its own expense make changes in piping, equipment, etc. and do all work necessary to eliminate objectionable noise or vibration.
2. Should noise or vibration found objectionable by the Commissioner be transmitted by any pipe or portions of the structure from equipment installed under the Contract, the Contractor shall at its own expense install such insulators and make such changes in or additions to the installations as may be necessary to prevent transmission of this noise or vibration.

T. **GROUTING** - The Contractor shall furnish all material and labor for proper bedding on Portland Cement grout, the equipment or its supporting base. Grout shall consist of one (1) part Portland Cement and one (1) part of approved sand. The top of the masonry foundation shall be properly cleaned and wetted before grouting. Grout shall completely fill all spaces between the equipment, or base, and the foundation and it shall generally average one (1) inch in thickness. Leveling wedges shall not be removed before the grout has reached its final set. Voids left by wedges shall be pointed with grout. Exposed surfaces of the grout shall have a finished appearance.

U. **PRELIMINARY FIELD TEST** - As soon as conditions permit, the Contractor shall furnish all necessary labor and materials for, and shall make, preliminary field tests of the equipment to ascertain compliance with the requirements of the Contract. If the preliminary field tests disclose equipment that does not comply with the Contract, the Contractor shall, prior to the acceptance test, make all changes, adjustments and replacements required.

V. **INSTRUCTIONS ON OPERATION** - At the time the equipment is placed in permanent operation by the City, the Contractor shall make all adjustments and tests required by the Commissioner to prove that such equipment is in proper and satisfactory operating condition. The Contractor shall instruct the City's operating personnel on the proper maintenance and operation of the equipment for the period of time called for in the Specifications.

### 1.37 **General Electrical Requirements**

**SCOPE** - This Article sets forth the general requirements applicable to electrical work for the Project. Such requirements are intended to be read in conjunction with the Specifications and Contract Drawings for the Project. In the event of any conflict between the requirements set forth in this Article and the requirements of the Specifications and/or the Contract Drawings, whichever requirements is the most stringent, as determined by the Commissioner, shall take precedence.

#### **PART A - PROCEDURE--ELECTRICAL APPROVALS**

**SCOPE**- This Section sets forth general electrical information, as well as required approvals for all electrical work required for the Project, including ancillary electrical work which may be included in contracts for other than the Contract for Electrical Work.

- A. **ELECTRIC SERVICE** - The electric service supply is subject to commercial and operating variation of the utility company. Proper provision shall be made to have all apparatus operate normally under these conditions.
- B. **SUPERVISION AND ACCEPTANCE** - The electrical work and equipment shall be installed under the supervision of the Commissioner's representative. Final acceptance and approval of the work will be contingent upon the inspection and test of the installation by the City regulatory agency, on completion.
- C. **TESTS** - The Contractor shall notify the Commissioner when the Contractor will examine and begin

work and shall also notify the Commissioner when the Contractor has completed the work and is ready to have it inspected and tested. Upon completion of the work and prior to final payment, tests shall be made as required by the Commissioner of all electrical materials, electrical and associated mechanical equipment, and of appliances installed hereunder. The Contractor shall furnish all labor and material for such tests. Should the tests show that any of the material, appliances or workmanship are not first class or not in compliance with the Contract, the Contractor on written notice shall remove and promptly replace them with other materials in conformity with the Contract.

D. CERTIFICATE OF THE BUREAU OF ELECTRICAL CONTROL, OF THE DEPARTMENT OF BUILDINGS (B.E.C.) - Before final payment is made, there must be filed with the Department of Design and Construction, a Certificate of Inspection signed by the Director of the B.E.C., which Certificate shall certify that all materials and workmanship comply with the rules and regulations of the B.E.C. of the City of New York and with the Electrical Code of the Administrative Code of the City of New York.

E. RESPONSIBILITY FOR CARE AND PROTECTION OF EQUIPMENT

1. The Contractor furnishing any equipment shall be responsible for the equipment until it has been finally inspected, tested and accepted, in accordance with the requirements of these Specifications.
2. After delivery and before and after installation, the Contractor shall protect all equipment against theft, injury or damage from all causes. The Contractor shall carefully store all equipment received for work, which is not immediately installed. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through a special dielectric test as directed by the Commissioner, at the expense of the Contractor or replaced by the Contractor without additional cost to the City.

F. UNIFORMITY OF EQUIPMENT - Any two (2) or more pieces of apparatus or materials of the same kind, type or classification and being used for identical types of service, shall be made by the same manufacturer.

G. CONTRACTOR'S ELECTRICAL DRAWINGS AND SAMPLES FOR APPROVAL

1. The Contractor shall submit to the Commissioner for approval, complete dimensional drawings of all equipment, wiring diagrams, motor test data, details of control, installation layouts showing all details and locations and including all schedules, and descriptions and supplementary data to comprise complete working drawings and instructions for the performance of the work. A description of the operation of the equipment and controls shall be included. A letter, in triplicate, shall accompany each submittal.
2. The Contractor shall submit duplicate samples of such materials and appliances as may be requested by the Commissioner for approval. These samples shall be properly tagged for identification and submitted for examination and test. After the samples are approved, one (1) sample will be returned to the Contractor and the other sample will be filed in the office of the Commissioner's representative for inspection use. After the Contract is completed, the second set of samples will be returned to the Contractor.

H. TIMELINESS - All material shall be submitted in sufficient time for the program of construction. Failure to promptly submit acceptable samples and dimensional drawings of equipment will not be accepted as grounds for an extension of time. The Commissioner may decline to consider submittals unless all related items are submitted at the same time.

I. CONTRACTOR'S STATEMENT WITH SUBMITTALS - All dimensional drawings of equipment, blueprints, catalogues, models, samples and other data relative to the equipment, the materials, the work or any part thereof submitted for approval are to be accompanied by a statement that they have been examined by the Contractor and that the drawings, data and other material submitted agree with the requirements of the Contract and Specifications and shall list and describe the points of

disagreements, if any exist. In the absence of such statement, approvals will be given with the understanding that articles of equipment or materials or methods of installation are in substantial compliance with the Contract and that if the adoption of these designs, details, articles, equipment, materials, constructions, installations, places and locations necessitate changes, alterations or replacements at an increased cost to the Contractor or others, the Contractor making the substitution for the specified equipment or material shall bear all such additional expense involved.

- J. **BULLETINS AND INSTRUCTIONS** - The Contractor shall furnish and deliver to the Commissioner, after acceptance of the work, four (4) complete sets of instructions, technical bulletins and any other printed matter (diagrams, prints, or drawings) required to provide complete information for the proper operation, maintenance and repair of the equipment and the ordering of spare parts.

#### **PART B - TEMPORARY LIGHTING, SITE SECURITY LIGHTING & POWER**

**SCOPE** - This Section sets forth the General Conditions and procedures relating to Temporary Lighting, Site Security Lighting and Power during the construction period, and is applicable to, and binding on, all Contracts insofar as they are affected.

A. **TEMPORARY LIGHTING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. Energy for the Temporary Lighting System for minor rehabilitation projects (those projects whose existing distribution system is not being changed or modified under the scope of this project) may be taken from the existing electrical distribution system if the existing system is of adequate capacity for the additional temporary lighting load. The Contractor for Electrical Work is to cooperate and coordinate with the facility custodian so as not to interfere with the normal operation of the facility.
2. Energy for the Temporary Lighting system for new projects and for those existing projects that are not covered in the preceding paragraph shall be provided as in the following paragraphs.
3. **CONNECTION TO UTILITY LINES** - Temporary Electric Service for use during construction shall be provided as follows: The Contractor for Electrical Work shall provide adequate service for the temporary lighting system, or a minimum of 100 Amperes, 3-phase, 4-wire service for the temporary lighting system, whichever is greater, and make all necessary arrangements with the Public Utility Company and pay all charges by them for the Temporary Lighting system. The Contractor for Electrical Work shall include in its bid any charges which may be made by the Public Utility Company for extending its electrical facilities, and for making final connections. The Contractor for Electrical Work shall make payment directly to the Public Utility Company.
4. **APPLICATIONS FOR METER** - The Contractor for Electrical Work shall make application to the Public Utility Company and sign all documents necessary for, and pay all charges incidental to, the installation of a watt hour meter or meters for Temporary Lighting. The Contractor for Electrical Work shall pay to the Public Utility Company, all bills for Temporary Lighting energy used throughout the work, as they become due.
5. **SERVICE AND METERING EQUIPMENT** - The Contractor for Electrical Work shall furnish and install, at a suitable location on the site, approved service and metering equipment for the Temporary Lighting System, ready for the installation of the Public Utility Company's metering devices. The temporary service mains to and from the metering location shall be not less than 100 Amperes, 3-phase, 4-wire and shall be of sufficient capacity to take care of all demands for Temporary Lighting and Site Security Lighting and shall meet all requirements of the NYCEC.
6. The Contractor for Electrical Work shall furnish and connect to the metered service point, a system of Temporary Lighting to illuminate the entire area where work is being performed and points adjacent to the work, with separately fused circuits for stairways and bridges. Control switches for stairway circuits shall be located near entrance on ground floor.

7. ITEMS - The Temporary Lighting System shall consist of wiring, fixtures, left-hand double sockets, (one (1) double socket for every 400 square feet, with one (1) lamp and one (1) three-prong outlet) lamps, fuses, locked type guards, trailers and any other incidental material. Additional details may be outlined in the detailed Specifications for the Electrical Work. Changes may be made, provided the full equivalent of those requirements is maintained.
8. The Temporary Lighting System shall be progressively installed as required for the advancement of the work under the various Contracts.
9. RELOCATION - Any Contractor requiring the relocation or extension of the original Temporary Lighting System that is not required due to the normal advancement of the work, as determined by the Commissioner's field representative, shall bear all costs thereof.
10. TRAILERS - Trailers shall be furnished with left-hand sockets with locked type guards and 40 feet of rubber covered cable. The Contractor for Electrical Work shall furnish and distribute a minimum of three (3) complete trailers to each Contractor. See the detailed Electrical Specifications for possible additional trailers required.
11. LAMPS - The Contractor for Electrical Work shall furnish and install one (1) complete set of lamps, including those for the trailers. Broken and burned out lamps in the general lighting system shall be replaced by the Contractor for Electrical Work while those in the trailers shall be replaced by the Contractor using such equipment. All lamps shall be 100 watt.
12. CIRCUIT PROTECTION - The Contractor for Electrical Work shall furnish and install GFI protection for the Temporary Lighting and Site Security Systems.
13. ENERGIZING - The Contractor for Electrical Work shall keep the Temporary Lighting System energized from a period of time, 15 minutes before the established starting time of that trade, which starts work earliest in the morning to 15 minutes after the established quitting time of that trade which stops work latest in the evening. This applies to every day in the week which is established as a regular working day for any trade involved in the construction of this facility and holds until completion and final acceptance of the work of the Contractor for Electrical Work or until the services are terminated by instructions from the Commissioner.
14. MAINTENANCE OF TEMPORARY LIGHTS
  - a. The Contractor for Electrical Work shall maintain the Temporary Lighting System in good working order during the scheduled hours established.
  - b. The Contractor for Electrical Work is to include in its contract all charges for energy for the Temporary Lighting System.
  - c. The Contractor is advised to show the estimated cost of the installation, maintenance and energy of temporary electrical facilities in its detailed cost estimate of its Contract so as to facilitate partial payments during construction.
15. OVERTIME USE - Any Contractor requiring Temporary Lighting Service before or after hours set forth hereinbefore, or on weekends or a Holiday for all trades involved in the construction of this facility, shall pay for the additional cost of keeping the system energized and repaired. If more than one (1) Contractor is involved, the charges shall be prorated, or shared by other acceptable means previously agreed upon by the Contractors involved. When overtime is required by all Contractors on the work, the provisions for payment for regular time use of the Temporary Lighting System shall apply.
16. SERVICE BEYOND COMPLETION DATE - When failure to comply with the terms and conditions of any Contract necessitates temporary light beyond the date set for completion of the Contract for Electrical Work, the Contractor requiring such additional service shall pay for keeping it energized. When more than one (1) Contractor requires such service, the expense thereof shall be prorated

as determined by the Commissioner.

17. **ADJUSTMENT IN CONTRACT PRICE FOR TEMPORARY LIGHTING MAINTENANCE** - In the event that the temporary lighting maintenance extends beyond the Contract time through no fault of the Contractor for Electrical Work, the additional maintenance cost will be in accordance with the requirements of the following paragraphs:

- a. Payment for maintaining Temporary facilities when required will be made at the average hourly wage for electricians plus 69% of this rate, for each hour of work done upon order of the Resident Engineer. Payments will be included in partial estimates upon submission of detailed vouchers stating date, hour and time expended for each item of work.
- b. The addition of 69% of the average hourly wage rate specified above shall be deemed as the total allowance for all profit and overhead and for any and all other costs and expenses of any nature whatsoever, including but not limited to allowance for insurance, workman's compensation, unemployment insurance and other supplementary benefits.

18. **REMOVAL OF TEMPORARY LIGHTING WIRING** - The temporary lighting system shall be removed by the Contractor for Electrical Work when authorized by the Commissioner.

19. **HAND TOOLS** - The temporary electric lighting system shall not be used for power purposes, excepting that light hand tools not larger than 1/4 horsepower may be operated therefrom by any Contractor.

**B. SITE SECURITY LIGHTING (FOR NEW CONSTRUCTION ONLY) (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. The Contractor for the Electric Work shall furnish, install and maintain a system of site security lighting, as herein specified, to illuminate the construction site of the project, and it shall be connected to and energized from the Temporary Lighting System.
2. It is essential that the site security lighting system be completely installed and operating, at the earliest possible date. All Contractors must cooperate, coordinate and exert every effort to accomplish an early complete installation of the site security lighting system. After the system is installed and in operation, and a part of the system interferes with the work of any trade, that trade shall be completely responsible for the expense of removing, relocating and replacing all equipment necessary to reinstate the system to proper operating conditions.
3. The system shall consist of flood lighting by pole mounted guarded sealed-beam units. Floodlight units shall be mounted 16 feet above grade. Floodlights shall be spaced around the perimeter of the site to produce an illumination level of no less than one (1) foot candle around the perimeter of the site, as well as in any potentially hazardous area or any other area within the site that might be deemed by the Resident Engineer to require security illumination. The system shall be installed in a manner acceptable to the Resident Engineer. The first lighting unit in each circuit shall be provided with a photoelectric cell for automatic control. The photoelectric cell shall be installed as per manufacturer's recommendations.
4. All necessary poles shall be furnished and installed by the Contractor for Electrical Work.
5. The site security system shall be kept illuminated at all times during the hours of darkness. The Contractor for Electrical Work, at its own expense, shall keep the system in operation, furnishing and installing all material necessary to replace all damaged or burned out parts.
6. The Contractor for Electrical Work shall be on telephone call alert for maintaining the system during the operating period stated above.
7. All materials and equipment furnished under this section shall remain the property of the Contractor for Electrical Work and shall be removed and disposed of by the Contractor for

Electrical Work upon completion of that phase of the project.

**C. TEMPORARY POWER**

1. Any Contractor requiring temporary power for equipment larger than 1/4 horsepower shall arrange with the Public Utility for service and pay for all electrical energy consumed by its lines.
2. The Contractor shall provide service, metering equipment and distribution centers as required, and be responsible for keeping the system in working order.
3. When directed by the Commissioner, the Contractor shall remove its own temporary power system.

**D. USE OF COMPLETED PORTIONS OF THE ELECTRICAL WORK**

1. **USE OF MAIN DISTRIBUTION PANEL** - As soon as the permanent electric service feeders and equipment, metering equipment and main distribution panel are installed and ready for operation, the Contractor for Electrical Work shall have the temporary lighting system changed over from the temporary service points to the main distribution panel.
2. **COST OF CHANGE OVER** - The Contractor for Electrical Work shall be responsible for all cost due to this change over of service and it shall also make application to the Public Utility Company for a watt hour meter to be set on the permanent meter equipment.
3. The requirements for temporary lighting specified herein shall be adhered to after change over of service.
4. **NO EXTRA COST** - The operation of the service and switchboard equipment shall be under the supervision of the Contractor for Electrical Work, but this shall in no way be interpreted to mean the acceptance of such part of the installation or relieve the Contractor from its responsibility for the complete work or any part thereof. There shall be no additional charge for supervision by the Contractor for Electrical Work.

**PART C - ELECTRICAL INSTALLATION PROCEDURE**

**SCOPE** - This Section sets forth the general installation procedure that shall apply to all electrical work and electrical equipment appearing in any of the Contracts.

- A. **INTENT OF CONTRACT DOCUMENTS** - Contract Specifications and Contract Drawings are to be interpreted as a means of conveying the scope and intent of the work without giving every minor electrical detail. It is intended, nevertheless, that each Contractor shall provide whatever labor and materials are found necessary, within the scope of its Contract, for the successful operation of the installation. Specific details of individual installations are to be finally decided upon when the Contractor submits Working or Shop Drawings for approval to the Department of Design and Construction. Whenever there are two (2) or more methods to complete project work within the Contract scope, the Commissioner reserves the right to choose that method which, in the Commissioner's opinion, will afford the most satisfactory performance, lasting qualities, and accessibility for repairs, even though this selection is the most costly.
- B. **SCHEMATIC PLANS - APPROXIMATE LOCATIONS** - Conduits and wiring are shown on the plans for diagrammatic purposes only. Therefore, conduit layouts may not necessarily give the actual physical route of the conduits. The Contractor who installs a conduit system will also be required, as part of the work, to furnish and install all hangers and pull-boxes, including any special pull-boxes found necessary to overcome interferences, and to facilitate the pulling of electrical cables. Similarly, the locations of equipment, appliances, outlets and other items shown on Contract Drawings are only approximate and are to be definitively established when equipment Shop Drawings are submitted and approved by the Department of Design and Construction during construction.

- C. **SLEEVES** - required for conduits passing through walls or floors, shall be furnished and set by the Contractor installing the conduits. Sleeves in waterproofed floors shall be provided with flashing extending 12 inches in all directions from sleeve and secured to waterproofing. Flashing shall be turned down into space between pipe and sleeve and caulked watertight. Flashing shall be 20 oz. cold rolled copper. Sleeves shall be supplied with welded flanges similar to those supplied by the Contractor for Plumbing Work and shall extend one (1) inch above finished floor.
- D. **COORDINATION** - Each Contractor shall keep in close touch with the construction progress and obtain the necessary information for the accurate placement of its work in ample time before project construction operations obstruct its work. Each Contractor is to consult all other Contract Drawings, as well as approved equipment Shop Drawings on file in the Resident Engineer's Field Office. This will aid in avoiding interferences, omissions and errors in the electrical installation.
- E. **RESPONSIBILITY FOR ERRORS OF INSTALLATION** - In case of interference with the work of others or erroneous placement of work with respect to equipment or structures, each Contractor shall cooperate with other affected Contractors for an immediate agreeable solution of the affected work with each Contractor furnishing its responsible share of the labor and materials necessary to complete the installation in an approved manner.
- F. **RESTORATION** - If drilling or cutting is done on finished surfaces of equipment or the structure, any marring of the surface shall be repaired or replaced by the Contractor who caused the damage. Each Contractor shall be held responsible for corrective restoration due to its cutting or drilling, and for any damage to the project or its contents caused by the Contractor or the Contractor's workers. Any Contractor who pierces waterproofing because of the installation of their work shall, at their own expense, restore the waterproofing to the satisfaction of the Commissioner.
- G. **ELECTRICAL WORK AT SITE** - Any Contractor who is required to furnish equipment consisting of a number of related electrical devices or appliances, mounted in a single enclosure, or on a common base, shall furnish this unit complete with internal wiring, connections, terminal boxes with copper connectors and/or lugs and ample electrical leads, ready for connection and operation. The cost of any wiring, re-wiring or other work required to be done on this unit in the field, shall be borne by the Contractor who furnished the unit, without cost to the City.
- H. **COOPERATION AMONG CONTRACTORS** - Whenever an electrically operated unit or system involves the combined work of several Contractors for its installation and successful operation, each Contractor shall exercise the utmost diligence in cooperating with others to produce a complete, harmonious installation.
- I. **DEFINITIONS**
1. **WIRING** means both wire and raceway (rigid steel, heavy wall conduit unless specifically indicated otherwise).
  2. **POWER WIRING** means wiring from a panelboard or other specified source to a starter (if required) then to a disconnect (if required) then to the final point of usage such as a motor, unit or device.
  3. **CONTROL and/or INTERLOCK WIRING** means that wiring that signals the device to operate or shut down in response to a signal from a remote control device such as a temperature, smoke, pressure, float, etc. device (starters and disconnect switches are not included in this definition) regardless of the voltage required for the controlling device.
- J. **WORK BY CONTRACTORS FURNISHING ELECTRICAL EQUIPMENT** - Any Contractor who furnishes an electrically operated or motorized unit of equipment shall install same and, as part of its Contract, perform the following work in connection therewith:
1. **FOUNDATIONS** - Unless otherwise specified or indicated, the Contractor furnishing electrically operated equipment shall also furnish and install approved foundations for same. Special

foundations, if required, will be described in the detailed Specification.

- a. MATERIAL - All foundations, unless required otherwise, shall rest on a structural slab and shall be of poured concrete, of a mixture specified for reinforced concrete. Foundations shall present a neat, smooth appearance without voids, sharp corners or edges.
  - b. DIMENSIONS - Foundation dimensions, height above floor, methods of setting, aligning and anchoring of equipment shall be as recommended by the manufacturer of equipment and approved by the Commissioner. The minimum height of foundations above finished floor shall be four (4) inches and foundations shall extend at least six (6) inches at all sides beyond the base plates of equipment.
2. At least one (1) inch of grout shall be applied under the equipment base plate after placement and alignment of the equipment.
  3. ITEMS - Anchor plates, bolts, sleeves, nuts and washers and other necessary items for proper installation of equipment shall be provided. The Contractor shall also furnish and set required templates to locate accurately the positions of the hold-down bolts.
  4. VIBRATION ISOLATION - If specifically required in the detailed Specifications for a particular unit, vibration isolators shall be provided for rotating equipment.
  5. SUPPORTS - If any motorized equipment is required to be mounted overhead or off a wall, the Contractor supplying the unit shall furnish and install a suitable platform, bracket or shelf, whichever is appropriate or specified, and mount the equipment thereon. This support shall be constructed of substantial steel members, plates, etc., and the whole securely fastened to the structure or to anchors previously embedded in the wall or slab. In case of excessive vibration transmitted to structure, isolating pads or other devices shall be installed. The Contractor shall apply one (1) coat of approved primer paint to the support and one (1) additional coat of approved paint in the field.
  6. ASSOCIATED EQUIPMENT - The Contractor who furnishes a motorized or electrically operated unit of equipment shall also furnish all associated motor starters, disconnect means, relays, control devices, lamps, or other devices, necessary for the successful functioning of the unit.
  7. POINT OF DELIVERY - Any item specified to be installed by the Contractor for Electrical Work and delivered to the site that can not be hand carried (due to bulk, weight or timeliness) to the location of its installation is to be delivered and set in place, leveled and secured by the Contractor furnishing the equipment. Such delivery shall be to the location where it is to be installed by the Contractor for Electrical Work.
  8. CONTROL AND INTERLOCK WIRING
    - a. General Construction Work and Plumbing Work.
      - (1) All control wiring associated with doors and door hardware is to be furnished and installed, unless otherwise indicated, by the Contractor furnishing the doors. Power for the door operation and for its controls shall be furnished and installed by the Contractor for Electrical Work.
      - (2) All other control wiring associated with equipment furnished by either the Contractor for General Construction Work or the Contractor for Plumbing Work is to be furnished and installed by the Contractor for Electrical Work.
    - b. Contractor for Heating, Ventilating and Air Conditioning Work
      - (1) The furnishing and installing of all control devices and all control and interlock wiring for equipment furnished under the Heating, Ventilating and Air Conditioning Contract shall be

by that Contractor, including any power required for any control device.

- (2) The Contractor for Heating, Ventilating and Air Conditioning Work shall deliver to the Contractor for Electrical Work all starters and disconnect switches specified to be furnished under the Heating, Ventilating and Air Conditioning Contract. The Contractor for Electrical Work is to install the starters and disconnect switches, and furnish and install all power wiring and make connections between the starter, disconnect switch and motor or equipment being served. The motor or equipment is to be mounted by the Contractor furnishing the motor.

9. **INSTALLATION OF BURNER** - The Contractor who furnishes and installs the gas/oil-fired boiler/furnace shall also include as part of its Contract, the work of furnishing, installing and connecting all equipment, controls with necessary conduits and wiring, to a service point provided by the Contractor for Electrical Work. Unless detailed otherwise in the Specific Requirements, the Contractor for Electrical Work shall furnish power from the power source to a junction box furnished and installed by the Contractor for the Electrical Work and located near the boiler/furnace control panel. The Contractor for Electrical Work shall also furnish and install an empty conduit and a junction box to be located at a remote location (outside of the boiler/furnace room) for an emergency shut-off switch. The shut-off switch and all other conduit and wire shall be furnished and installed by the Contractor furnishing the boiler/furnace.

**K. WORK BY CONTRACTOR FOR ELECTRICAL WORK** - The Contractor for Electrical Work shall perform the following work:

1. **PANELETTE** - The Contractor for Electrical Work shall furnish and install a four (4) circuit panelette in each mechanical equipment room.
2. **STARTERS AND DISCONNECT SWITCHES** - The associated disconnect switches and starters approved by the Department of Design and Construction which require mounting or wiring apart from a main equipment unit shall be delivered, prewired, to the Contractor for Electrical Work at the site of the project, who shall install and wire them. The electrical Contractor shall acknowledge acceptance in writing to the Contractor supplying them, and thereafter assume responsibility for their safe keeping until final acceptance of its work by the City.
3. **CONTROL DEVICES** - The Contractor for Electrical Work shall install conduit, wire, and make all connections for all interlock and control devices furnished under the Plumbing Work Contract and also all control and interlock devices furnished under the General Construction Work Contract, except for door control wiring. The various control and interlock devices, furnished (prewired) by the Contractors for Plumbing and General Construction Work Contractors, shall be installed and final connections made by the Contractor for Electrical Work.
4. **DOOR CONTROL WIRING** - Unless specifically detailed otherwise in the Contract Documents for Electrical Work, all door control and interlock devices are to be furnished and installed and wired by the Contractor furnishing the required control and interlock devices.
5. **TESTS** - The Contractor supplying the equipment, together with the Contractor for Electrical Work shall cooperate in making preliminary tests to establish the correctness of the installation. If a faulty operation of the unit is discovered, the Contractor whose work is the cause shall, without delay, remedy the trouble.

**L. PAINTING**

1. Ingredients and methods of application shall conform to that as required for similar work under the Contract for General Construction Work.
2. **ALL METAL CABINETS** - including switchboards, panelboards, boxes (pull, junction and outlet), trims, doors and covers shall be painted as follows:

- All surfaces inside and outside, one (1) approved coat of primer. All accessible surfaces one (1) coat of approved paint inside and outside, in the field after installation.
3. **HANGERS. CONDUITS AND FITTINGS** – The Contractor who installs them shall give one (1) field applied, approved coat primer, followed by a second coat.
  4. **FINAL COAT**--A final or third coat of paint, as directed, shall be applied by the Contractor installing them when the wall surfaces on which they are supported or the ceiling from which they are hung are not painted by the Contractor for General Construction Work. Pull boxes shall be neatly and legibly stenciled to show service.
  5. **PAINTING OF MOTORIZED EQUIPMENT** - The Contractor furnishing electrically driven equipment shall paint motors and driven equipment, starters and controllers and other equipment provided by the Contractor. The Contractor shall provide any painting or finishing that may be required in the Specifications. For certain equipment having special corrosion resistant factory finishes, painting may be waived by special permission. Equipment shall be neatly stenciled, with legible characters to indicate service by the Contractor who supplies the equipment.
  6. **NAME PLATES** - shall be left clean of all paint.

**PART D - ELECTRICAL CONDUIT SYSTEM INCLUDING BOXES (PULL, JUNCTION AND OUTLET) - (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

**SCOPE** - This Section sets forth the requirements applying to any Contract requiring the installation of electrical conduits, boxes or fittings. Rigid steel conduit shall be used through out, unless specifically indicated otherwise. **TYPES**-where the word 'conduit', without a modifier such as, rigid steel, EMT, etc., is specified to be used, it shall be interpreted to mean, rigid steel, heavy wall, threaded conduit.

**A. CONDUIT TYPES**

1. **RIGID STEEL CONDUIT** - shall be interpreted to mean rigid steel, heavy wall conduit that is hot dipped galvanized inside and outside. The conduit shall meet the requirements of the latest edition, as amended, of the "Standard for Rigid Steel Conduit" of the Underwriters' Laboratories, Inc. Unless otherwise specified in the Specifications or indicated on the Contract Drawings, rigid steel conduit shall be used for all exposed work, for all underground conduits in contact with earth and for fire alarms systems as required by the Building Code. Rigid steel conduit shall be used for all underground conduits in contact with earth, for Fire Alarm Systems and as required by authorities having jurisdiction.
2. **ELECTRICAL METALLIC TUBING (EMT)** - shall be industry standard thin wall conduit of galvanized steel only. All elbows, bends, couplings and similar fittings which constitute a part of the conduit system shall be specifically designed for use with electric metallic tubing. Couplings and terminating fittings shall be of the pressure type as approved by the Commissioner. Set screw fittings will not be acceptable. EMT shall meet the requirements of the latest edition, as amended, of the "Standard for Electrical Metallic Tubing of the Underwriters Laboratories Inc." EMT may only be used where specifically indicated. In no case will EMT be permitted in spaces other than hung ceilings and dry wall partitions.
3. **FLEXIBLE METALLIC** - For final connections to motors and motorized equipment, not more than a 4' - 0" length of flexible conduit may be used; for watertight installations, this conduit shall be of a watertight type, attached with watertight glands or fittings, for final connections from outlet box to recessed lighting fixtures and in locations only where specifically permitted by the Specifications or Contract Drawings.

**B. INSTALLATIONS AND APPLICATIONS**

1. Unless otherwise specified or indicated on the Contract Drawings, conduit runs shall be installed

concealed in finished spaces.

2. **CONDUIT SIZES** - The sizes of conduit shall be as indicated on the Contract Drawings. Wherever conduit sizes are not indicated, the conduit shall meet the requirements of the NYCEC to accommodate the conductors to be installed therein.
3. Conduits shall be reamed smooth after cutting. No running threads will be permitted. Universal type couplings shall be used where required. Conduit joints shall be screwed up to butt. Empty conduits after installation shall have all open ends temporarily plugged to prevent the entrance of water or other foreign matter.
4. Conduits being installed in concrete or masonry shall be securely held in place by the Contractor installing them during pouring and construction operations. A group of conduits terminating together shall be held in place by a template.
5. **UNDERGROUND STEEL CONDUITS** - Unless otherwise specified, all underground steel conduits in contact with earth shall be encased by the Contractor who installs them, in a covering of not less than two (2) inches of an approved concrete mixture. Concrete mix shall be one (1) part cement to four and one-half (4 ½) parts of fine and coarse aggregate.
6. **EXCAVATION RESTORATION PERMITS** - The Contractor installing underground conduits, duct banks or manholes shall perform, as part of its Contract, the work of cutting pavement, excavation shoring, keeping trenches or holes pumped dry, backfilling, restoration of surfaces to original condition and removal of excess earth and rubbish from premises. During the work, the Contractor shall provide adequate crossovers, protective barriers, lamps, flags, etc., to safeguard traffic and the public. When the work is in a public highway or street, the Contractor shall secure and pay for all necessary permits and inspection fees and pay the cost of repaving.
7. **EXPOSED CONDUIT SUPPORTS** - Exposed conduit shall be supported by zinc coated hangers with necessary inserts, beam clamps of approved design or attached to walls or ceilings by expansion bolts. Exposed conduits shall be supported or fastened at intervals not more than five (5) feet.
8. Exposed conduit shall be installed parallel or at right angles to ceiling, walls and partitions. Where direction changes of exposed conduit cannot be made with neat bends, such as required around beams or columns, conduit type fitting shall be used.
9. The conduit shall be installed with an approved expansion joint:
  - a. Wherever the conduit crosses a building expansion joint (each Contractor will be held responsible for determining where the building expansion joints are located).
  - b. Every 200 feet, when in straight runs of 200 feet or longer.
10. Conduit may only enter and leave a floating slab in the vertical direction, and then only in an approved manner. Horizontal entries into floating slabs are not permitted.
11. Conduit installed in pipe shafts shall be properly supported to carry the total weight of the raceway system complete with cable. In addition at least one (1) horizontal brace per 10 ft. section shall be provided to assure stability of the raceway system.
12. **BUSHINGS AND LOCKNUTS** - Approved bushings and locknuts shall be used wherever conduits enter outlet boxes, switch boxes, pull boxes, panel board cabinets, etc. For conduits one (1) inch in diameter or larger, insulating bushings to be O.Z. or approved equal.
13. **CONDUIT BENDS** - shall be made without kinking conduit or appreciably reducing the internal diameter. All bends in conduit of two (2) inch in diameter or larger shall be made with an hydraulic or power pipe bender. The radius of the inner edge of any bend shall not be less than six (6)

times the internal diameter of the conduit where rubber covered conductors are to be installed. And not less than 10 times the internal diameter of the conduit where lead covered conductors are to be used. Long gradual sweeps will be required, rather than sharp bends, when changes of direction are necessary.

#### 14. EMPTY CONDUITS

- a. TESTS - All conduits and ducts required to be installed and left empty shall be tested for clear bore and correct installation by the Contractor who installed them using a ball mandrel and a brush and snake before the installation will be accepted. The ball shall be of lignum vitae turned to approximately 85% of the internal diameter of the raceway to be tested. Two (2) short wire brushes shall be included in the mandrel assembly. Snaking of conduits, ducts, etc., shall be performed by the Contractor in the presence of the Electrical Inspector. Any conduits or ducts which reject the mandrel shall be cleared at once with the Contractor bearing all costs, such as chopping concrete, to replace the defective conduit and restore the surface to its original condition.
- b. TAGS - Numbers or letters shall be assigned to the various conduit runs, and as they test clear they shall be identified by a fiber tag not less than 1-¼ inch width, attached by means of a nylon cord. All conduit terminations in panel, splice or pull boxes as well as those out of the floor or ceiling shall be tagged.
- c. TEST RECORDS - As the conduit runs clear, a record shall be kept under the heading of "Empty Conduit Tested, Left Clear, Tagged and Capped" showing conduit designation, diameter, location, date tested and by whom. When complete, this record shall be signed by the Electrical Inspector and submitted in triplicate for approval. This record shall be entered on the Record drawings, which are required under "General Conditions Governing All Contracts."
- d. CAPPING - All empty conduit and duct openings, after test, shall be capped or plugged by the Contractor as directed.
- e. DRAG LINES - A drag line shall be left in all empty conduit.

#### C. BOXES

1. The Contractor shall furnish and erect all pull boxes indicated on the plans or where required. Sides, top and bottom of pull boxes shall be zinc coated and shall be built of No. 12 USSG steel reinforced at corners by substantial angle irons and riveted or welded to plates. Bottom or side of pull boxes shall be removable and held in place by corrosion resistant machine screws. Pull boxes in damp locations shall have threaded hubs and gaskets. All pull boxes shall be suspended from ceiling or walls in the most substantial manner.
2. For large boxes, sufficient suitable porcelain clamp insulators or other approved devices shall be provided in the pull boxes for supporting the cables passing through the box so that the cables will not be unsupported for a distance greater than three (3) feet and so as to permit a neat and orderly arrangement of the cables.
3. For pull boxes having the largest side more than nine (9) square feet in area, special rectangular and diagonal angle-iron bracing will be required as approved.
4. Pull boxes of special or odd shapes are required to be installed by the Contractor, even though not shown on plans, where necessary to overcome interference or to facilitate the pulling of conductors in conduits.
5. In centering outlets, the Contractor is cautioned to allow for overhead pipes, ducts and other obstructions, and for variations in arrangement and thickness of fireproofing, soundproofing and plastering. Precautions should be exercised regarding the location of window and door trims,

paneling, etc. Mistakes resulting from failure to observe these precautions, must be corrected by the Contractor without cost to the City. Outlets in hung ceilings shall be supported from the black iron or structure.

6. The exact location of all outlets in finished rooms shall be as directed. When the interior finish has been applied, the Contractor shall make any necessary adjustment of its work to properly center the outlets. All outlet boxes for local switches near doors shall be located at the strike side of doors as finally hung, whether so indicated on the drawings or not.
7. Exposed wall outlet boxes shall be erected neatly and tight against the walls and securely anchored to same.
8. All wall outlets of each type shall be set accurately at the same level on each floor, except where otherwise specified or directed. Where special conditions occur, outlets shall be located as directed.
9. **MOUNTING HEIGHTS** - The following heights are standard heights and are subject to correction due to coordination with Contract Drawings. All such changes must be approved by the Resident Engineer. Heights given are from finished floor to center line of outlet or device on wall or partition, unless otherwise indicated.

a. General Convenience Outlets (mount vertical)	1'-6"
b. Clock Outlets	8'-6" or 1'-6" below ceiling
c. Wall Lighting Switches	4'-0"
d. Motor Controllers	5'-0"
e. Motor Push-button	4'-2"
f. Telephone Outlets	As Directed
g. Fire Alarm Bells	8'-6" or 1'-6" below ceiling
h. Fire Alarm Stations	4'-0"
i. Intercom Outlet	1'-6"
j. Cooking and Refrigerator Unit	As Directed
10. Outlet boxes shall be of approved design and construction; of form and dimensions suited and adapted to its specific location; the kind of fixture to be used and the number and arrangements of conduits, etc., connecting therewith. All ferrous outlet boxes shall meet the requirements for zinc coating as specified under Electrical Conduit Systems.
11. There shall be knockouts opened only for the insertion of conduit. Any outlet boxes with more openings than are necessary for conduit insertion, shall be sealed by the Contractor without additional charge.
12. All outlet boxes and junction boxes for exposed work shall be galvanized cast iron or cast aluminum with threaded openings. Outlet boxes for exposed inside work in damp locations shall be galvanized cast iron or cast aluminum with threaded hubs and neoprene gaskets.
13. Junction boxes shall not be less than 4 11/16" square and shall be equipped with zinc coated plates. Where plates are exposed they shall be finished to match the room decor.
14. **FIXTURE SUPPORTS** - Outlet boxes supporting lighting fixtures shall be equipped with fixture studs held by approved galvanized stove bolts or integral with the box. Cast iron or malleable boxes shall have four (4) tapped holes for mounting required cover or fixtures.
15. Outlet boxes exposed to the weather or indicated W.P., shall be cast iron or cast aluminum and the covers made watertight with neoprene gaskets. The boxes shall have external lugs for mounting. Drilling of the body of the fitting for mounting will not be permitted. The cover screws shall be appropriate in size, noncorrodible and not less than four (4) in number for each box opening.

**PART E - ELECTRICAL WIRING DEVICES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. WALL SWITCHES shall be of the best specification grade, quiet type, and shall have a rating of 20 Amperes at 277 volts, as manufactured by Bryant, Hubbell or approved equal. The mechanism shall be equipped with arc snuffers. They shall be of the tumbler type, single pole. Switches of the 3-way type shall have a similar rating.
- B. RECEPTACLES
  - 1. CONVENIENCE OUTLETS - shall be of the best specification grade, duplex, two-pole, 3-wire, 15 Amperes at 125 volts. It shall have a grounding pole that shall be grounded to the conduit system. Receptacles shall be capable of both back and side wiring and shall have only one (1) grounding screw. Receptacles shall be Hubbell Cat. #5262 or approved equal.
  - 2. HEAVY DUTY RECEPTACLE OUTLETS - shall have the Ampere rating and the number of poles specified on the Contract Drawings and shall be Hubbell, Russell-Stoll, Bryant, AH & H or approved equal. Each outlet shall have a grounding pole, which shall be grounded to the conduit system.
  - 3. FLOOR RECEPTACLES - shall be Russell & Stoll #3040 or approved equal, to fit into floor box previously specified.
  - 4. NAMEPLATES - are required for all receptacles other than 120V.
- C. CLOCK HANGERS - Clock outlets for surface type clocks shall be equipped with a supporting hook and recessed faceplate to conceal the electrical cord.
- D. WATERTIGHT DEVICES - For installations exposed to weather or in damp locations, the devices shall be in a gasketed, cast iron enclosure.
- E. PLATES
  - 1. Every convenience outlet and switch outlet shall be covered by means of a stainless steel No. 302 - 0.4" antimagnetic plate with an approved finish, unless provided otherwise in the detailed Specifications.
  - 2. Where two (2) or three (3) switches are grouped together a single faceplate shall be used. Where more than three (3) switches are located at one (1) point, the faceplates may be made up in multiple units.

**PART F - ELECTRICAL CONDUCTORS AND TERMINATIONS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. CONDUCTORS FOR LIGHT AND POWER - All wire and cable shall be of annealed copper of 98% conductivity. Aluminum wire or cable will not be permitted. The insulation shall be flame retardant, moisture and heat resistant, thermoplastic, type THW or THWN rated for 600 volts at 75 degrees C. for both wet and dry locations. Wires No. 8 or larger shall be stranded. Wires and cables shall also be subject to the requirements of the NYCEC. Cables for incoming service or wire in conduits contiguous with the earth or in concrete or other damp or wet locations shall be synthetic rubber insulated with neoprene jacket, heat and moisture resistant and shall be equal to UL Type USE and rated for 600 volts at 75 degrees C. for both wet and dry locations.
- B. FIXTURE WIRE - Lighting fixtures shall be wired with No. 14 gauge wire designated as AWM and rated at 105 degrees C.
- C. OTHER TYPES - Cables and wires for interior communication systems are described in detailed

Specifications of applicable Contracts.

- D. **MINIMUM SIZE** - Conductors smaller than No. 12 AWG shall not be used for light or power.
- E. **COLOR CODE** - Wires shall have a phase color code, and multiple conductor cables shall be color coded.
- F. **CABLE DATA** - The Contractor shall submit for approval the following information for each size and type of cable to be furnished.
  - 1. **Manufacture of Cable** - Location of Plant.
  - 2. **Minimum insulation resistance** at standard test temperature.
  - 3. **Days required for delivery** to site of work after order to proceed with manufacture.
- G. **ORIGINAL REELS** - Cable and wire shall be delivered to the site of the work on original sealed factory reels.
- H. **TESTS**
  - 1. **NOTIFICATION OF TEST** - No cable shall be released for shipment from the mill unless authorized by the Commissioner. The Contractor shall give the Commissioner at least 10 days notice when the cable will be available for testing at the mill. The Contractor's representative or inspector shall have access during working hours to all parts of the plant where the cable is being manufactured, and all reasonable inspection and testing facilities shall be afforded to the Contractor without increase in price to the City. The Inspector shall witness the complete test of cable and receive a copy of all test data.
  - 2. **TEST DATA** - The Contractor shall forward to the Commissioner six (6) copies of all test data for approval before accepting shipment of the cable.
  - 3. **INSPECTION DURING MANUFACTURE** - The Commissioner reserves the right to dispatch a representative to the factory at any time during the period of manufacture of the cable for the purpose of expediting or checking progress. The living and traveling expenses of the City Engineers making these inspections and witness tests will be borne by the City of New York.
  - 4. **TEST IN CITY LABORATORY** - Sufficient additional length of conductor shall be provided on each reel, so that a six (6) foot sample may be removed for testing in the City's Laboratories. This sample shall be cut from the reel in the presence of the Inspector of the Department of Design and Construction and cut in two (2) three-foot lengths, each piece to be tagged showing reel number, size and type, manufacture, date, name or project & Contract number. Samples shall be handed to the Inspector for transmittal. If it is found as the result of test that the cable does not comply with the approved factory test the Contractor will be ordered to remove all cable which came off the reel and has been installed, and to replace the defective cable not used, without cost to the City. The Contractor will be held responsible for any delays in the construction program caused by the defective cable.
  - 5. **FINAL FIELD TEST** - After conductors are installed and connected, the City will test the work for overall insulation resistance. The Contractor shall furnish all test equipment necessary. To be acceptable, the test shall meet the requirements set forth in the NYCEC.
- I. **WIRE INSTALLATION**
  - 1. **INSTALL WIRES AFTER PLASTERING** - Feeder and branch circuits wiring shall not be installed in conduit before the rough plastering work is completed. No conductors shall be pulled into floor conduits before floor is poured.

2. CONDUIT SECURED IN PLACE - No conductor shall be pulled into any conduit run before all joints are made up tightly and the entire run rigidly secured in place.
3. WIRE ENDS - All wires shall be left with sufficiently long ends for proper connection and stowing.
4. PULLING COMPOUNDS - When required to ease the pulling-in of wires into conduit, only approved compounds as recommended by cable manufacturers shall be used.
5. PRESSURE CONNECTORS - for wires shall be of the cast copper or forged copper pressure plate type. Connectors shall be O.Z., Burndy, National Electric Products or approved equal.
6. Splices and feeder taps in the gutters of panel boxes shall be made by means of pressure plate type connectors encased in composition covers as manufactured by O.Z., Burndy, National Electric Products or approved equal.
7. Splices in branch wiring for sound systems and fire systems, shall be first made mechanically secure, then soldered and taped.
8. In lieu of soldered splices (except for sound and Fire Systems, which must have soldered splices) the following alternates are acceptable for operating temperatures up to 105 degrees C., for fluorescent fixtures and for the splicing of branch circuit wiring up to No. 8 AWG wire:
  - a. Mechanical splices made with mechanical connectors as manufactured by the Minnesota Manufacturing Company "Scotchlock" or approved equal. Mechanical connectors requiring a special tool (pressure connectors, insulators and locking rings) by Buchanan or approved equal. The tool used for connector application shall be as approved by the connector manufacturer.
  - b. For wire and cable No. 6 AWG and larger for branch circuit wiring the seamless tubular connector will only be accepted. Application of this connector shall be with a tool recommended by the connector manufacturer.
9. TAGS - All feeders and risers shall be tagged at both ends, and in all pull and junction boxes and gutter spaces through which they pass. Such tags shall be of fiber and have the feeder designation and size stamped thereon.
10. BRANCH CIRCUIT WIRING
  - a. The Contractor installing branch circuit wiring shall test the work for correct connections and leave all loop splices in the fixture outlet boxes properly spliced and taped. The Contractor shall provide wire ends long enough for convenient connection to device.
  - b. NEUTRALS - No common neutrals shall be used except for lighting branch circuits. Each neutral wire shall be terminated separately on a neutral busbar in the panelboard. No common neutrals will be permitted for convenience receptacle branch circuits.

#### J. TERMINATIONS

1. LUGS - All lugs for all devices and all cable terminations shall be copper. AL/CU rated lugs will not be permitted. The only exception to this requirement is when the particular device is not manufactured with copper lugs by any manufacture. Lugs for No. 6 AWG cable and larger shall be cast copper or forged copper pressure plate type. Lugs for 1/0 and larger shall be fastened with two (2) bolts.
2. All lugs shall be of the proper size to accept the cable connected to them. Any Contractor furnishing a device containing lugs is to coordinate with the Electrical Work Contract Documents to insure that the device terminations are adequate for the wire or cable (whose size may be larger than expected due to voltage drop considerations) connected to the device. This requirement

applies to both the Contractor for Electrical Work whose branch circuit protector must have lugs of the proper size, as well as to the Contractor who furnishes the device who may have to increase the size of that particular device.

**PART G - CIRCUIT PROTECTIVE DEVICES (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

SCOPE - This Section sets forth the circuit protective devices such as circuit breakers and safety switches, used in connection with Motor Control Equipment, Distribution Centers, Panelboards and Service Entrance.

**A. CIRCUIT BREAKERS**

1. CIRCUIT BREAKERS shall be operable in any position and shall be of the quick-make, quick-break type on manual operation. The handle shall be trip free, preventing contacts from being held in closed position against abnormal overloads or short circuits. Positive visual indication of automatic tripped position of breaker shall be provided, in addition to the "On" and "Off" indication. All circuit breakers shall be of the bolted type.
2. TRIP RATING - Circuit breakers shall be provided with the required number of trip elements, calibrated at 40 degrees C., ambient temperature, in accordance with wire sizes or motor currents as shown on Contract Drawings or indicated in the Specifications.
3. POLE BARRIERS - Multipole pole breakers shall be designed to break all poles simultaneously. They shall be provided with barriers between poles and arc suppressing devices.
4. ELEMENTS - Multipole circuit breakers shall have frames of not less than a 100 Ampere rating. Multipole circuit breakers for 480 volts AC operation shall have an NEMA interrupting rating of 18,000 Amperes, unless a higher rating is specified in the Specific Requirements or indicated on the Contract Drawings.
5. For circuit breakers with frame size up to and including 225 Amperes, the breakers may be provided with non-interchangeable trip elements. For frame ratings above 225 Amperes, the breakers shall be provided with interchangeable trip elements, which can be replaced readily.
6. The trip rating of all circuit breakers shall not exceed 70% of frame rating.
7. Single pole circuit breakers for branch circuits shall have a frame size of no less than 100 Amperes, and shall be rated at 125 volt A.C. with a NEMA interrupting rating of 10,000 Amperes, unless a higher rating is specified in the Specific Requirements or indicated on the Contract Drawings.
8. INVERSE TIME ACTION - The circuit breakers shall be dual element type, one (1) element with time limit characteristics, so that tripping will be prevented on momentary overloads, but will occur before dangerous values are reached, the other with instantaneous trip action. Inverse time delay action shall be effective between a minimum tripping point of 125% of rating of breaker and an instantaneous tripping point between 600% and 700% of rated current.
9. CONSTANCY OF CALIBRATION - The tripping elements shall insure constant calibration and be capable of withstanding excessive short circuit conditions without injury.
10. CONTACTS shall be non-welding under operating conditions and of the silver to silver type.
11. TEMPERATURE RISE - Current carrying parts, except thermal elements shall not rise in temperature in excess of 30 degrees C. while carrying rated current at rated frequency.
12. NUMBERING - Each circuit breaker shall be distinctly numbered when installed in a group with other breakers. The calibration of trip element shall be indicated on each breaker.

**B. SAFETY SWITCHES**

NEMA TYPE HD - When safety switches are permitted to be used for service entrance, motor disconnecting means or to control other types of electrical equipment, they shall be of the type HD of a rating not less than 30 Amperes. Enclosures shall be provided with means for locking. For ratings above 60 Amperes terminals shall have double studs.

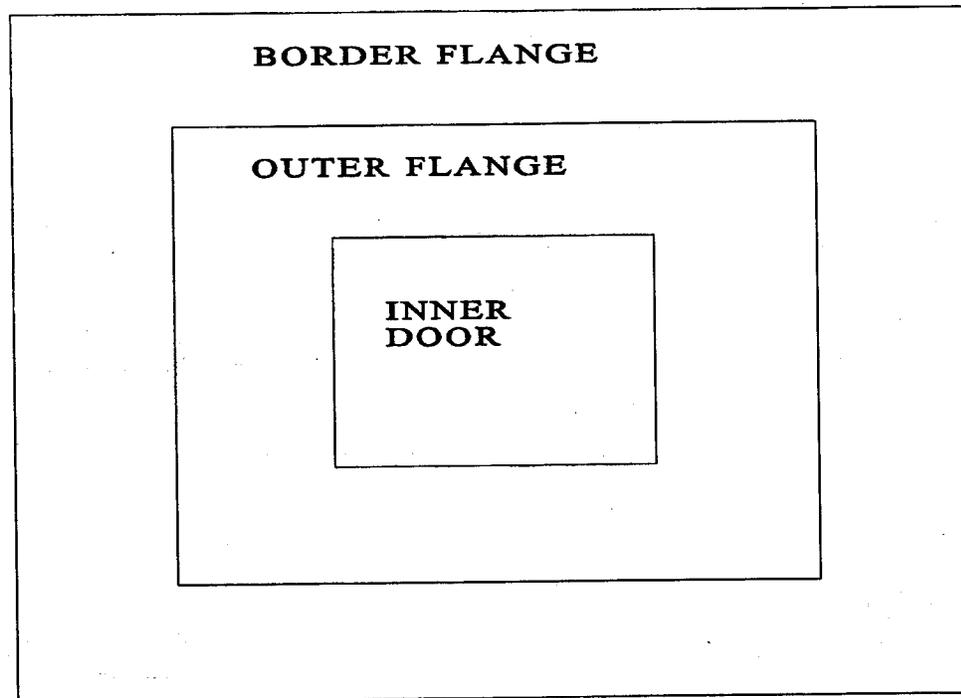
**PART H - DISTRIBUTION CENTERS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

**SCOPE** - This Section sets forth the construction and installation procedure for Switchboards, Panelboards and Cabinets.

- A. PANELBOARDS--GENERAL TYPE** - The panelboards shall be of the automatic circuit breaker type with individual breakers for each circuit, removable without disturbing the other units. Circuit breakers shall be in accordance with the requirements outlined under "Circuit Protective Devices."
- B. NUMBER AND RATING OF CIRCUIT BREAKERS** - The Contract Drawings show a layout of each panel, giving the number, frame, size and trip setting of circuit breakers and number of branch circuits and spare breakers. Each branch circuit shall be distinctly numbered.
- C. BUS-BAR CONSTRUCTION AND SUPPORT** - Panel Boards shall be of the deadfront type and shall have bus bars and branch circuits designed to suit the system and voltage. Current carrying parts, exclusive of circuit breakers shall be copper and based on a maximum density of 1,000 Amperes per square inch. Bus bars for the main switchboard shall be designed for the frame rating of the Service Breaker. Bus bars shall run up the center of the panel, unless otherwise indicated, and shall have connected thereto the various branch circuits. Unless otherwise specified, bus bars for each panelboard shall be equipped with main lugs only and capacity as required on Contract Drawings. Where main protection is required, automatic circuit breakers shall be used. A neutral bus of at least the same capacity as a live bus bar shall be provided for the connection of all neutral conductors. Each terminal shall be identified. All current carrying parts, exclusive of circuit breakers, shall be of copper with a minimum number of joints. The bus bar structure shall be a self supporting unit, firmly fastened to a ½ inch plastic board, extending the full length and width of assembly which shall serve to insulate the bus structure from the back of panel box. Other methods affording equally effective bus structure support and insulation will be given consideration. An insulating barrier shall separate neutral bus from other parts of panel.
- D. CIRCUIT BREAKER ASSEMBLY** - The entire circuit breaker and bus bar assembly shall be mounted on an adjustable metal base or pan and secured to the back of panel box. The panel shall have edges flanged for rigidity.
- E. PANEL MOUNTING** - The panel shall be centered in the panel box to line up with door openings and set level and plumb so that no live parts are exposed with the door open.
- F. PANEL CABINET CONSTRUCTION AND SUPPORT**
1. Panel boxes shall be fabricated from No. 12 USSG sheet steel of no more than three-piece construction, reinforced at the corners and with continuous welds. Boxes having a back whose area is larger than 16 square feet, shall be of No. 10 USSG sheet steel and reinforced to provide ample stiffness and to prevent buckling. Boxes shall be of sufficient size to afford a clear gutter space on all sides, of not less than six (6) inches.
  2. **PANEL CABINET INSTALLATION** - When installed surface, or in panel closets, they shall be mounted on Kindorf channel, supported from floor slab to ceiling slab.
  3. Where cabinets cannot be set entirely flush due to shallow walls or partitions or where cabinet is extra deep, the protruding sides of cabinet shall be trimmed with a metal or hardwood return

molding of approved design and fastened to cabinet so as to conceal the intersection between the wall and cabinet.

- G. **CABINET TRIM** - Trim for both lighting and power panelboards shall be door-in-door type installation as depicted in **DETAIL A TRIM FOR LIGHTING AND POWER PANELBOARDS**. Construction details are to be as described in the following paragraphs.



**DETAIL A TRIM FOR LIGHTING AND POWER PANELBOARD**

1. **CABINET TRIM** - The trim and doors for lighting and power panels shall be made of No. 12 USSG full finish sheet steel in one (1) piece. Cabinet trim larger than 16 square feet shall be made of No. 10 USSG. The inner door shall cover the circuit breaker section only and be provided with appropriate brass hinges. The outer door shall cover the entire gutter space and shall be attached to the border type flange with appropriate hinges. Both doors for power panels shall be provided with a New York City Lock No. 511S, with key change to No. 47 and two (2) keys. For lighting panels, the inner door shall be provided with a substantial catch. All hinges shall be of the concealed type. Locks shall be flush with trim. In addition, for panels requiring doors over 48 inches in height, furnish a vault handle and a 3-point catch arranged to fasten door at top, bottom and center.
  2. The door shall close against a flange or rabbet to afford a dust tight fit. All space between the panel and the cabinet trim shall be closed by means of a sectional plate secured to the trim.
  3. The border flange of the trim shall be fastened to the box with oval head screws finished to prevent corrosion or with approved trim clamps.
  4. To facilitate installation of trim, a suitable angle iron shall be spot welded across the bottom of each trim to carry the weight of the trim while the holding screws are being put in place.
- H. **MOTOR CONTROL CENTERS** - Motor centers shall be furnished by the Contractor as indicated in the Specifications or Contract Drawings, but shall be installed by the Contractor for Electrical Work.
- I. **NAMEPLATES** - Nameplates where required, shall be made of engraved Lamicoid sheet, or approved

equal. Letters and numbers shall be engraved white on a black background (except for Firehouse projects which shall have white letters on a red background) the Contractor shall submit an engraved sample for approval as to design and style of lettering before proceeding with the manufacture of the nameplate. Nameplates shall be of suitable size and shall also be provided at the top of the switchboard or section thereof and on the trim at the top of all lighting and power panels. Similar nameplates shall also be provided for each distribution circuit breaker giving the breaker number, the number of the feeder, and the name of the equipment fed.

- J. SHOP DRAWINGS - showing all details of boxes, panels, etc., shall be submitted for approval.
- K. DIRECTORIES - A directory shall be fastened with brass screws and consist of a noncorrosive metal frame with dimensions not less than five (5) inches x eight (8) inches and a transparent window of Plasticile, Plexiglass, Lucite or approved equal that is not less than 1/16 inch thick over cardboard or heavy paper. The directory shall be typewritten and show the number of each circuit, the name of circuit and lighting or equipment supplied. The size of riser feeder shall be as indicated on directory. The dimensions of directory shall be submitted for approval for each size of panel.
- L. CONSTRUCTION
  - 1. FINISH - Panel boxes, doors and trim for installation in dry locations, shall be zinc coated after fabrication by the hot-dip galvanizing or electroplate process on inside and outside surfaces. In damp locations, panelboards shall be enclosed and gasketed NEMA 3R type. Panelboards located outdoors or exposed to the weather shall be cast iron.
  - 2. PAINTING - Panel boxes, doors and trim shall receive a coat of approved priming paint and a second coat of approved paint in the field after installation. Paint shall be applied to the inside and outside of boxes and on both sides of trim. Panel trims and doors shall receive a third or finishing coat on the outside after installation. Approval as to texture and color must be obtained before the final coat is applied. All of the aforementioned painting is to be done by the Contractor who furnishes the boxes and trim. Where panel trims or boxes are installed on walls which are to be painted, the previously mentioned third or finishing coat of paint shall be included in the work of the Contractor who has the Contract for general interior painting.

**PART I - MOTORS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

SCOPE - This Section sets forth the general design, construction and performance requirements, which shall apply to all motors furnished in any of the Contracts.

- A. MOTOR DESIGN - All motors shall be designed to comply with the New York State Energy Code currently in effect. Motors shall have standard NEMA frames and shall have nameplate ratings adequate to meet the specified conditions of operation. Motor performance under variable conditions of voltage and frequency shall be within the limits set in NEMA standards, unless modified in present Specifications. Motors shall be expressly designed for the hazard duty load, voltage and frequency as specified in the Contract. All motor windings shall be copper. All motors intended to operate on a 208 volt system shall be designed and rated for 200 volts.
- B. MOTORS OF SAME MANUFACTURER - Unless expressly permitted otherwise by the Commissioner, all motors under the same Contract shall be manufactured by the same company. Exceptions may be granted in the case of motors of 1/4 horsepower rating and smaller, or for a motor that is an integral part of the equipment, with its housing especially built for this purpose.
- C. STANDARDS OF COMPARISON - In general, the best standard products of the leading motor manufacturers shall be considered as a standard for comparison. The requirements of the NEMA standards for motors and generators shall be deemed to contain the minimum requirements of performance and design.
- D. OBJECTIONABLE NOISES - Objectionable noises will not be tolerated and exceptionally quiet motors

may be required for certain specified locations. Noise control tests as per the Building Code of the City of New York may be performed as directed by the Commissioner. Such motors shall bear a nameplate lettered "Quiet Motor." Springs and slip rings shall be of approved non-ferrous material.

**E. BEARINGS**

1. Bearings, unless specified otherwise, shall be of the ball or roller type. Motors one (1) horsepower and larger that are equipped with ball roller bearings shall also have lubrication of the pressure-relief greasing type. Each Contractor who furnishes four (4) or more such motors shall also furnish, as part of its Contract, a pressure grease gun of rugged design, of approximately 10 ounce capacity, complete with necessary adapters. The Contractor shall also provide 10 pounds of approved gun grease.
2. For any particular unit where sleeve bearings are deemed desirable, permission for their use may be granted by the Commissioner. Motors one (1) horsepower and larger that are equipped with sleeve type bearings shall in addition to having protected accessible fittings for oiling be provided with visible means for determining normal oil level. Lubrication shall be positive, automatic and continuous.

**F. MOTOR TERMINALS AND BOXES** - Each motor shall be furnished with flexible leads of sufficient length to extend for a distance of not less than three (3) inches beyond the face of the conduit terminal box. This box shall be furnished of ample size to make and house motor connections. These requirements shall be met irrespective of any other standards or practices. Size of cable terminals and conduit terminal box holes shall be subject to approval. For motors five (5) horsepower or larger, each terminal shall come with two (2) cast or forged copper pressure type connectors with bolts, nuts and washers. For motors of smaller ratings, connectors of other acceptable types may be furnished. For installations exposed to the weather or moist locations, terminal boxes shall be of cast iron with threaded hubs and gasketed covers. Cover screws shall be of non-corrosive material.

**G. MOTOR TEMPERATURE RISES** - The motor nameplate temperature rises for the various types of motor enclosures shall be as listed below:

- |   |               |
|---|---------------|
| 1. Open Frame                               | 40 degrees C. |
| 2. Totally enclosed and enclosed fan cooled | 55 degrees C. |
| 3. Explosion proof and submersible          | 55 degrees C. |
| 4. Partially enclosed and drip proof        | 40 degrees C. |

The temperature of the various parts of a motor shall meet the requirements of NEMA standards for the size and type of the motors. Tests for heating shall be made by loading the motor to its rated horsepower and keeping it so loaded for the rated time interval or until the temperature becomes constant.

**H. SPECIAL CODE INSTALLATIONS** - Electrical installations covered by special publications of NBFU and by special City rulings and regulations shall comply in design and safety features with such applicable codes, regulations and rulings, and shall be furnished and installed complete with all accessories and safety devices as therein specified.

**I. MOTORS ON LIGHTING PANELS** - The largest A.C. motor permitted on branch circuits of lighting panels shall not exceed 1/4 horsepower.

**J. MOTORS RATED 1/2 horsepower and larger shall be polyphase.**

**K. TESTS**

1. **FACTORY INSPECTION** - Electrical equipment and devices (except portable) not covered by standard Specifications or tests herein prescribed shall be inspected and witnessed on test at the factory with the tested equipment being completely assembled and connected under conditions approved by the Commissioner as equivalent to the actual working conditions. Suitability and

ruggedness of the design for the specified purpose will be a condition for acceptance.

2. **SHOP TESTS** - to determine the load performance of motors shall be made in accordance with Standard C-50, of the ASA. Motors shall meet the requirements of C-50 for insulation resistance, dielectric strength, efficiency and temperature rise. Efficiency (and power factor for A.C. motors) shall be established for 50, 75 and 100 percent of rated horsepower but for motors of 100 horsepower or larger, the 125 percent loading shall be included.
  3. **TEST REPORTS** - The result of shop tests shall be submitted to the Commissioner for approval and shall be on forms approved by the City. The evaluated test data shall include a signed statement confirming the fact that the equipment meets the requirements of the standards of performance.
  4. **MANNER OF TEST** - For motors of 100 horsepower or smaller, check tests against complete tests of similar motors will be accepted. For motors larger than 100-horsepower, complete tests for each motor furnished shall be made, and certified test data sheets shall be submitted for approval, unless shop tests are required by the Detailed Specifications.
  5. **PREFERRED METHODS** - The efficiency of fractional horsepower motors shall be determined by the input-output method; for larger motors up to and including 100 horsepower, the separate loss method as specified in ASA Standards C-50 will be accepted unless otherwise required in the Specifications.
- L. **SPARE PARTS** - The Contractor who furnishes motors, including fractional horsepower, shall provide the following spare parts and accessories in connection therewith:
1. **BRUSHES** - One (1) additional set of brushes for each motor equipped with them.
  2. **BEARINGS** - For each group of three (3) and fraction thereof, of each type and size of motor, the Contractor shall furnish one (1) set of extra bearing linings or ball or roller bearings. Where less than three (3) of any type of motor is involved, one (1) set of extra bearings shall be furnished.
  3. **SPRINGS** - One (1) set of brush springs used in slip ring motor or universal type motors.
  4. **WRAPPER MARKING** - All parts shall be delivered neatly and securely wrapped and boxed, plainly tagged and marked for identification and reordering.

**PART J - MOTOR CONTROL EQUIPMENT (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

**SCOPE** - This Section sets forth the requirements for motor controllers and associated devices, which are applicable to all Contracts under which motor control equipment is furnished or installed.

- A. **MANUFACTURER** - All control equipment furnished under one (1) Contract shall be the product of a single manufacturer. Exceptions to this rule may be granted in the case of controllers for fractional horsepower motors driving special equipment, the various units of which have been engineered to obtain specific performance.
- B. **CONTROL ITEMS REQUIRED** - The Contractor who furnishes a motor shall also furnish therewith complete disconnecting, starting and control equipment as required by the detailed Specifications, the various code authorities and for the successful operation of the driven equipment. These items include circuit breaker, magnetic starter with overload protection and low voltage release or protection, push button stations, pilot lights and alarms, float, pressure, temperature and limit switches, load transfer switches, devices for manual operation and speed controllers, etc. The Contractor shall furnish as many of these items as are required for the successful operation of the driven unit.
  1. Where a motor is to be located out of sight of the controller, the Contractor who furnishes the motor shall furnish an approved disconnecting means to be mounted near motor.

C. TYPES OF STARTERS

1. SQUIRREL CAGE - A.C. motors of the squirrel cage type, rated from one (1) to 30 horsepower shall have magnetic across the line starters; motors rated above 30 horsepower shall be furnished with reduced voltage (autotransformer type) starter or part winding start with time delay to reduce inrush current. Size of starters shall be based on 200V. operation.
2. SLIP RING - A.C. Motors of the slip-ring type shall be furnished with primary across the line starters interlocked with secondary starting and regulating equipment. The interlocking feature shall prevent starting of the motor when the secondary controller is off the initial starting point.
3. MAGNETIC - For fractional horsepower motors, magnetic type starters are not required unless the particular method of controlling the driven equipment makes them necessary. Where individual single phase fractional horsepower motors or the sum of fractional horsepower motors controlled by an automatic device are ½ horsepower or more, magnetic starters and circuit breakers shall be used. Single phase A.C. motors smaller than ½ horsepower or three-phase A.C. motors smaller than one (1) horsepower where manual control is specified may be furnished with starters of toggle switch or push button type with inbuilt thermal protection. No additional disconnecting means is required to be furnished with this type of starter. This type of starter may also be used in series with automatic control devices such as thermostats, float and pressure switches, provided the individual motor or the sum of fractional horsepower motors is less than ½ horsepower. Means for manual operation shall be provided.

D. DISCONNECTING BREAKER - All motor starters, unless otherwise specified shall be provided with a disconnecting means in the form of a circuit breaker of the type specified under "CIRCUIT PROTECTIVE DEVICES" of the General Conditions. This disconnecting means shall be contained in the same housing with the starter and shall be operable from outside. Means shall be provided for locking the handle of the circuit breaker in the "OFF" position if it is desired to take the equipment out of service and prevent unauthorized starting.

E. CONTROL CABINET - DRY LOCATIONS - all starters shall be furnished with general purpose, NEMA Type 1, sheet metal enclosures with hinged covers and baked enamel finish.

F. CONTROL CABINET - WATERTIGHT - In wet locations, cast iron watertight enclosures with threaded hubs, galvanized and gasketed hinged covers shall be provided.

G. 1. PANELS - Motor control devices and appliances shall be mounted on approved insulating slabs with all wiring and connections made on the back of the slabs.

2. WIRING AND TERMINALS - Wiring connections for currents of 100 Amperes or less may be made with copper wire or cable with special flameproof insulating coverings. Such wires shall be installed in a neat workmanlike manner, flat against the slab, and held in place by clips. Connections shall be made with pressure connectors for No. 8 AWG and larger wires, and with grommets for small stranded wires. Except for incoming and outgoing main leads, all connections shall terminate on approved connector blocks, which may be installed on the face of the slab. For small, across the line starters the above requirements may be modified if satisfactory connections are provided.

3. COPPER BUS - For currents exceeding 100 Amperes, copper bus shall be used in place of wires. The bus shall be constructed of copper rods, tubing or flat strap, bent and shaped properly and securely attached to the slab in a neat and workmanlike manner. The cross section of copper shall provide sufficient areas to keep current density at not more than 1,000 Amperes per square inch.

H. COOPERATION - The Contractors who furnish electrically operated equipment shall give to the Contractor for Electrical Work full information relative to sizes and locations of apparatus furnished by them which require electrical connections.

Equipment being installed by the Contractor for Electrical Work shall be delivered to the Contractor for Electrical Work by other Contractors in proper time and sequence so that the Contractor for Electrical Work shall be able to meet the Contractor for Electrical Work working schedule.

**I. SPARE PARTS**

1. **FURNISH** - Each Contractor shall furnish the following spare parts pertaining to equipment furnished by each Contractor.

One (1) set of contact fingers and springs and thermal elements for each three (3) (or fraction) of each size of magnetic contactor starter.

One (1) holding coil for each three (3) (or fraction) of each size of magnetic contactor starter.

2. **WRAPPER MARKING** - All parts shall be delivered to the Resident Engineer neatly wrapped and boxed and plainly tagged and marked for identification and reordering.

**PART K - SCHEDULE OF ELECTRICAL EQUIPMENT**

Schedule D requirements for electrical motor equipment may be included in one or more of the Specifications for the separate contracts for the Project. SCHEDULE D delineates the responsibilities of each separate contractor for electrical motor control equipment. SCHEDULE D is included in the Addendum to the General Conditions. In the event of any conflict between the Specifications and SCHEDULE D, SCHEDULE D shall take precedence; provided, however, in the event of an omission from SCHEDULE D (i.e., SCHEDULE D omits either a reference to or information concerning electrical motor equipment which is set forth in the Specifications), such omission from SCHEDULE D shall have no effect and the Contractor's obligation with respect to the electrical motor control equipment, as set forth in the Specifications, shall remain in full force and effect.

**1.38 Safety**

- A. Each Contractor shall provide and maintain all necessary temporary closures, guard rails, and barricades to adequately protect all workers and the public from possible injury. Any Contractor requiring removal of these items shall be responsible for the replacement of same.

**1.39 Interruption of Services and of Project Facilities**

- A. **EVENING AND WEEKEND WORK** - Where the work makes temporary shutdowns of the services unavoidable, they shall be made at night or on weekends or at such times that will cause no interferences with the established routines and operations of the projects in question.

1. Where weekend or evening work is required due to unavoidable service shutdowns, such work shall be performed at no extra cost to the City.

**B. INTERRUPTION OF PROJECT FACILITIES**

1. The Contractor shall not interrupt any of the services of the project nor interfere with these in any way without the permission of the Commissioner. Such interruption, or interferences, shall be made as brief as possible, and only at such time stated.
2. Under no circumstances will the Contractor, or its workers, be permitted to use any part of the project as a shop, without the permission of the Commissioner.
3. Unnecessary noise shall be avoided at all times and necessary noise shall be reduced to a minimum.
4. The facility operates 24 hours per day seven (7) days a week. Toilet facilities, water and electricity

must be operational at all times. No services of the project can be interrupted in any way without the permission of the Commissioner. Careful coordination of all work with the Resident Engineer must be done to maintain the operational level of the project personnel.

5. Contractors shall schedule their work to avoid noise interference that will affect the normal functions of the project. In particular, construction operations producing noises that are objectionable to the project functions will be scheduled at times of day or night, day of the week, or weekend, which will not interfere with the project personnel. Any additional cost resulting from this scheduling shall be borne by the specific Contractor.
6. The Contractor shall arrange to work continuously, including overtime, if required, to assure that services will be shut down only during the time actually required to make the necessary connections to the existing work.
7. The Contractor shall give ample written notice in advance to the Commissioner and project personnel of any required shutdown.

**1.40 Separation of Work Between Trades (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- A. SCHEDULE E – Requirements for various items of work are included in the Specifications for the separate contracts for the Project and in the General Conditions. Schedule E delineates the responsibilities of each separate contractor for various items of work, as well as the extent to which certain items involve coordination between trades. Schedule E is included in the Addendum to the General Conditions. The delineation set forth in Schedule E shall be taken as specific instruction to the Contractor that it is responsible for the listed items of work. Schedule E is not intended to limit the Contractor's responsibility for supervision and coordination as set forth in Paragraph B below. In the event of any conflict between the Specifications, the General Conditions and Schedule E, Schedule E shall take precedence; provided, however, in the event of an omission from Schedule E (i.e., Schedule E omits either a reference to or information concerning an item of work which is set forth in the Specifications or the General Conditions), such omission from Schedule E shall have no effect and the Contractor's obligation to perform the work, as set forth in the Specifications or the General Conditions, shall remain in full force and effect.
- B. SUPERVISION AND COORDINATION - Each Contractor is required to supply all necessary supervision and coordination information to any other trades who are to supply work to accommodate their installations.

**1.41 Shop Drawing and Material Samples Schedule**

- A. SCHEDULE F – Schedule F sets forth all submittal requirements for shop drawings and material samples. Schedule F is included in the Addendum to the General Conditions. At the kick-off meeting, each Contractor must review this Schedule with the Commissioner's Representative and the Consultant. Within 10 days after the kick-off meeting, the Contractor must complete information on Schedule F concerning the submission date, the required delivery date and the fabrication time. For all required submittals of shop drawings and material samples, the Schedule F provided by the Contractor must indicate a submission date which is at least 20 days prior to the date of the manufacture of the item or materials to be installed. In addition, if so directed by the Commissioner, the Schedule F provided by the Contractor must indicate a submission date for shop drawings and/or material samples of specified items or materials which is within 60 days after the kick-off meeting. In the event of any conflict between the Specifications and Schedule F, Schedule F shall take precedence; provided, however, in the event of an omission from Schedule F (i.e., Schedule F omits either a reference to or information concerning a submittal requirement which is set forth in the Specifications), such omission from Schedule F shall have no effect and the Contractor's submittal obligation, as set forth in the Specifications, shall remain in full force and effect.
- B. COORDINATION - The Resident Engineer for this project will coordinate and review the data submitted by various Contractors. Upon acceptance by the Resident Engineer, the Resident Engineer

will date and sign the schedule as approved and transmit it to the Consultant, Contractors and Project Manager within the Department of Design and Construction.

- C. ARTICLE 11 - Thereafter, this schedule will be subject to the provisions of Article 11 of the agreement and must be strictly adhered to by the Contractor.

**1.42 Specific Requirements**

- A. The work of this article shall be the responsibility of the Contractor for General Construction Work, unless otherwise indicated.

**B. FIELD MEASUREMENTS**

1. Each Contractor shall verify all dimensions and conditions on the job so that all work will properly join the existing work.
2. Each Contractor, before commencing work, shall examine all adjoining work on which each Contractor's work is in any way dependent on good workmanship in accordance to the intent of the Specification and Contract Drawings. The Contractor shall report to the Commissioner any condition that will prevent any Contractor from performing work that is below the required standard.

**C. BORINGS (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. REFERENCE DRAWINGS - The Boring Drawings as listed on the title sheet are for information to the bidder and are to be used under the conditions as follows:
2. BORING LOGS - shown on the Boring Drawings, record information obtained under engineering supervision in the course of exploration carried out by or under the direction of forces of the Department of Design and Construction at the site.
3. SOIL AND ROCK SAMPLES - All inferences are drawn from the indications observed as made by engineering and scientific personnel. All such inferences and all records of the work including soil samples and rock cores, if any, are available to bidders for inspection.
4. CERTIFICATION OF SAMPLES - The City certifies that the work was carried out as stated, and that the soil samples and rock cores, if any were referred to, were actually taken from the site at the times, places and in the manner indicated. The samples are available for inspection in the Department of Design and Construction Subsurface Exploration Section.
5. BIDDER'S RESPONSIBILITY - The bidder, however, is responsible for any conclusions to be drawn from the work. If the bidder accepts those of the City, it must do so at its own risk. If the bidder prefers not to assume such risk, the bidder is under the obligation of employing its own experts to analyze the available information, and must be responsible for any consequences of acting on their conclusions.
6. CONTINUITY NOT GUARANTEE - The City does not guarantee continuity of conditions shown at actual boring locations over the entire site. Where possible, borings are located to avoid all obstructions and previous construction which can be found by inspection of the surface and the bidder is required to estimate the influence of such features from its own inspection of the site.

**D. DEFERRED CONSTRUCTION**

1. Where necessity for deferred construction is certified by the Commissioner, in order to permit the installation of any item or items of equipment required to be furnished and installed under any other Contract in effect concurrent with the time allowed for doing and completing the work of the Contract, the Contractor shall defer construction work limited to adequate areas as approved by

the Commissioner.

2. The Contractor shall confer with the affected Contractors and ascertain arrangements, time and facilities necessary to be made by the Contractor in order to execute the provisions specified herein.

**E. WORK FENCE ENCLOSURE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. The Contractor shall furnish and erect a wood fence to the extent shown on the drawings enclosing the entire project on all sides. All materials used shall be new. Any permit required for the installation and use of said fence shall be borne by the Contractor.
2. THE FENCE shall be 7'-0" high with framing construction of yellow pine, using 4" x 4" posts on not more than 6'-0" centers, with three (3) rails of at least 2" x 4" size to which shall be secured boards, 3/4" x 6" tongue and groove, laid solid and surface and double nailed to each bearing. Posts shall be firmly fixed in the ground at least 30" and thoroughly braced. Top edge of fence shall be trimmed with a rabbeted edge mould. Provide on the street traffic sides of fence, observation openings as directed. The Contractor has the option of using 1/2" exterior grade plywood in lieu of the 3/4" x 6" tongue and groove boards.
3. GATES - Provide an adequate number of double gates, complete with hardware, located as approved by the Resident Engineer. Double gates shall have a total clear opening of 14'-0" with two (2) 7'-0" hinged swinging sections. Hanging posts shall be 6" x 6" and shall extend high enough to receive and be provide with tension or sag rods for the swinging sections.
4. PAINTING - The fence and gates shall be entirely painted on the street and public sides with two (2) coats of approved lead and oil paint. The below-grade section of the posts shall be first creosoted or given a coat of tar base paint. Black stenciled signs reading "POST NO BILLS" shall be painted on fence with three (3) inch high letters on 25 foot spacings for the entire length of fence on street traffic sides. Signs shall be stenciled five (5) feet above the sidewalk.
5. It shall be the obligation of the Contractor to remove all posters, advertising signs, and markings, etc., immediately.
6. Where sidewalks are used for "drive over" purposes for Contractor vehicles, a suitable wood mat or pad shall be provided for protection of sidewalks.
7. Where required, make provision for fire hydrants, lampposts, etc.
8. REMOVAL - When directed by the Resident Engineer, the fence shall be removed.

**F. PUMPING**

1. Furnish and install all necessary automatically operated pumps of adequate capacity with all required piping to run-off agencies, so as to maintain the excavation, cellar floor, pits and exterior depressions and excavations free from accumulated water during the entire period of construction and up to the date of final acceptance of work of the Contract.
2. All pumps shall be maintained at all times in proper working order.

**G. RESIDENT ENGINEER'S OFFICE**

1. OFFICE SPACE IN EXISTING BUILDING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)
  - a. The Resident Engineer will arrange for office space for sole use in the building where work is in progress. The Contractor for General Construction Work shall provide and install a lockset

for the door to secure the equipment in the room. The Contractor for General Construction Work shall provide two (2) keys to the Resident Engineer. After completion of the project the Contractor for General Construction Work shall replace the original lockset on the door and ensure its proper operation.

- b. The Contractor for General Construction Work shall provide one (1) telephone, where directed, for the exclusive use of the Resident Engineer. The Contractor for General Construction Work shall pay all costs for telephone service for calls within New York City limits for the duration of the project. The telephone service shall continue for a period of 90 days following substantial completion.
- c. The Contractor for General Construction Work shall provide the following equipment:
  - (1) Two (2) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Two (2) lockers, metal olive green or gray, single units, 15" x 18" x 78" overall including 6" legs. Lockers to have flat key locks with two (2) keys each, General Steel products or approved equal. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks approximately 52"H x 28 1/2"D x 18"W in a grey finish by Art Steel No. 2904L or approved equal.
  - (2) One (1) 9000 B.T.U. air conditioner or as directed by Commissioner. Wiring for the air conditioner shall be minimum No. 12 AWG fed from individual circuits in the fuse box.
  - (3) Two (2) metal wastebaskets, 13 inches square 15 inches high with rubber feet and corners by Art Metal Company No. 168 or approved equal.
  - (4) One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
  - (5) One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the Contract as required.

**2. TRAILER OFFICE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

- a. The Contractor for General Construction Work shall provide at its own cost and expense a trailer and install and connect all utility services to trailer within twenty (20) days of start of work. The trailer shall have equipment having the minimum requirements hereinafter specified. Any permit required for the installation and use of said trailer shall be borne by the Contractor.
- b. The trailer shall remain the property of the Contractor for General Construction Work except that the file cabinets herein specified, shall become the property of the City of New York.
- c. Trailer shall be office type trailer of the following general minimum dimensions:
  - 1. Length, overall: 35 feet.
  - 2. Length, inside: 32 feet.
  - 3. Width, overall: 8 feet.
  - 4. Width, inside: 7 feet, 5 inches.
- d. Trailer shall be manufactured by International Trailer Company, Model No. 1 MU-35-D or Atlantic Trailer Corporation, Model No. F-36 or approved equal.
- e. The exterior of the trailer and the wheels shall be given an approved coat of exterior enamel. The enamel finish coat shall be DUPONT orange lacquer or approved equal. The trailer shall be lettered with black block lettering of the following heights with white borders:

CITY OF NEW YORK	2-1/2"
DEPARTMENT OF DESIGN AND CONSTRUCTION	3-3/4"
DIVISION OF STRUCTURES	3-1/2"
RESIDENT ENGINEER'S OFFICE	2-1/2"

NOTE: In lieu of painting letters on trailer the Contractor for General Construction Work may substitute a sign constructed of a good quality lumber with the same type and size of lettering above.

- f. All windows and doors shall have insect aluminum screens and wire mesh protective screening.
- g. The interior shall be finished in 1/4 inch plywood. Plywood shall be finished in natural color, with two (2) coats of varnish or lacquer.
- h. The interior shall be divided by partitions into one (1) large room in front of trailer, and a private office approximately 6' x 7' at rear of trailer and a washroom located adjacent to the private office.
- i. The washroom shall be equipped with a flush toilet, wash basin with two (2) faucets, medicine cabinet, complete with supplies by Hospital Supply and Watters Labs., Inc., Model No. 1 or approved equal and a toilet roll tissue holder. Plumbing and fixtures shall be approved house type, with each appliance trapped and vented and a single discharge connection. Five (5) gallon capacity automatic electric heater for domestic hot water shall be furnished.
- j. The heating system shall consist of thermostatically controlled electric baseboard heaters capable of delivering not less than 30,000 BTU per hour and heaters shall be as manufactured by Chromalox or approved equal, sized per area with individual approved thermostats.
- k. The trailer shall be equipped with an approved two-circuit, 110-120 volt armored cable wiring system of adequate capacity complete with entrance connector with provision for grounding, enclosed fused service switch and branch circuit fuse box. The circuits for lighting, water heater, heater and convenience outlets, etc. shall be two-conductor, No. 12. The circuits for the space heaters shall be sized minimum No. 12 wire led from individual circuits in the branch circuit fuse box. Metal boxes shall be provided at all outlet points. All wiring shall conform to the requirements of the Electrical Code of the City of New York for armored cable wiring systems.
- l. Lighting to be furnished by a minimum of four (4) 48 inch, single tube, fluorescent fixtures for the large rooms and an incandescent fixture for the washroom. Lighting fixtures shall be provided with built-in pull-chain switches. A minimum of six (6) duplex convenience outlets shall be installed; four (4) in the larger room and two (2) in the smaller room. These outlets shall be in addition to connections for electric space heaters and heaters for domestic hot water.
- m. In addition to the washroom and private office, the following shall be built-in to the trailer:
  - 1. The drafting or reference table at least 60 inches long by 36 inches wide with cabinet below, head shelf at each end of the trailer, wall type plan rack at least 42 inches wide and wardrobe opposite washroom.
- n. The following movable equipment shall be furnished:
  - 1. Four (4) single pedestal desks, 42" x 32"; two (2) swivel chairs with arms and three (3) side chairs without arms to match desk. Four (4) lockers, metal olive green or gray, single units, 15" x 18" x 78" overall including 6" legs. Lockers to have flat key locks with two (2) keys each, General Steel products or approved equal. Two (2) full ball bearing suspension four (4) drawer vertical legal filing cabinets with locks approximately 52" H x 28 1/2" D x 18"W in a grey finish by Art Steel No. 2904L or approved equal.
  - 2. One (1) 6000 B.T.U. and one (1) 9000 B.T.U. air conditioner. Wiring for the air conditioners shall be minimum No. 12 AWG fed from individual circuits in the fuse box.

3. Two (2) metal wastebaskets, olive green or grey finish, 13 inches square 15 inches high with rubber feet and corners by Art Metal Company No. 168 or approved equal.
  4. One (1) fire extinguisher one (1) quart vaporizing liquid type, brass, wall mounted by Pyrene No. C21 or approved equal.
  5. One (1) Crystal Springs water cooler with bottled water, Model No. LP14058 or approved equal to be furnished for the duration of the Contract as required.
- o. TRAILER TEMPORARY SERVICE - Plumbing and electrical work required for the trailer will be furnished and maintained as below.
1. PLUMBING WORK - shall include all water supply and drainage piping required for a complete installation. Contractor to provide a temporary water service from the City's water main and extend in the trailer and properly connect up all fixtures requiring water supply. Provide all necessary soil, waste, vent and drainage piping.
    - a. Plumbing Contractor to frost-proof all water pipes to prevent freezing.
    - b. REPAIRS, MAINTENANCE - The Plumbing Contractor provide repairs when and as required for a period of thirty (30) days after the date of substantial completion acceptance.
    - c. DISPOSITION OF PLUMBING WORK - At the expiration of the time limit set forth in Subparagraph 3, the water drainage connections and piping to the office trailer shall be removed and shall be plugged at the mains. All piping shall become the property of the Contractor for Plumbing Work and shall be removed from the site, all as directed. All repair work due to these removals shall be the responsibility of the Contractor for General Construction Work.
  2. ELECTRICAL WORK - The Contractor for Electrical Work shall furnish, install and maintain a temporary electric feeder to the trailer to be used by the Resident Engineer immediately after it is placed at the job site.
    - a. The temporary electric feeder shall be at least three (3) No. 6RH wire and shall be protected by a 60 Ampere fused safety switch, complying with codes and utility requirements having jurisdiction.
    - b. Make all arrangements and pay all costs to provide electric service.
    - c. Pay all costs for current consumed and for maintenance of the system in operating condition, including the furnishing of the necessary bulb replacements lamps, etc., for a period of thirty (30) days after the date of substantial completion acceptance.
    - d. Disposition of Electric Work: At the expiration of the time limit set forth, the temporary feeder, safety switch, etc., shall be removed and disposed of as directed.
    - e. All repair work due to these removals shall be the responsibility of the Contractor.
- p. MAINTENANCE
1. The Contractor for General Construction Work shall provide and pay all costs for hot and cold water, heat and fuel and regular daily janitor service. Furnish toilet paper, cloth towels and soap and maintain the field office in first-class condition, including all repairs, until 30 days after the date of substantial completion acceptance.
  2. Provide fire, extended coverage and vandalism, malicious mischief and burglary and theft

insurance coverage for the Resident Engineer's field office equipment in the amount of \$10,000. All insurance coverage shall be provided by a company licensed and authorized to do business in the State of New York. Such coverage must, under the loss payable clause or by endorsement thereon, state the following: "loss, if any, payable to the City of New York."

3. At 30 days after the date of substantial completion acceptance, or sooner as directed by the Commissioner, the Contractor for General Construction Work shall have all services disconnected and capped to the satisfaction of the Resident Engineer.
- q. The Contractor for General Construction Work shall provide and pay all costs for the following telephone services for the Resident Engineer's trailer:
  1. Two (2) desk phones
  2. One (1) wall phone (with six (6) foot extension cord) at plan table.
  3. A remote bell located on outside of trailer
  4. The telephone service shall continue for a period of 90 days following substantial completion.
- r. Should it become necessary to relocate the trailer or move the field office from one (1) location to another, Contractor for General Construction Work shall be responsible for move or moves and of reconnecting all utilities described above at new location, and shall assume all costs incurred.
- s. PERMITS - The Contractor for General Construction Work shall make the necessary arrangements and obtain all permits required for this work.
- t. The Contractor for General Construction Work has the option of providing, at its cost and expense, rented office or store space in lieu of trailer. Said space shall be in the immediate area of the Project and have adequate plumbing, heating and electrical facilities. Space chosen by the Contractor for General Construction Work must be approved by the Commissioner before the area is rented. All insurance maintenance and equipment required for trailer field office shall also apply to rented spaces.

**H. ADDITIONAL EQUIPMENT FOR THE RESIDENT ENGINEER (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. The Contractor for General Construction Work shall supply photo equipment not to exceed \$250. Said equipment to be specified by Resident Engineer. At the completion of the project, the equipment shall become the property of the City of New York.
2. The Contractor for General Construction Work shall provide a copy machine for paper sizes 8½ x 11 & 8½ x 14. Copier shall remain at job site 30 days beyond the Substantial Completion date.
3. The Contractor for General Construction Work shall furnish a fax machine and a telephone answering machine at commencement of the project. All materials shall be new, sealed in manufacturer's original packaging and shall have manufacturers' warranties. All items shall remain the property of the City of New York at the completion of the project.
4. Computer Workstation (Refer to the Addendum to the General Conditions for the number of Computer Workstations to be provided):

Computers shall be provided for all contracts that have a total duration of 180 Consecutive Calendar Days (CCDs) or more, as set forth in Schedule "A". Contracts that have a total duration of less than 180 CCDs shall not require computers. Computer workstations shall be provided for

the duration of the contract.

(1) Personal Computer(s) - Workstation Configuration.

- (a) Make and Model: Dell, Gateway, Toshiba, HP, IBM, or an approved equal. (Note: an approved equal requires written approval of the Assistant Commissioner of ITS.)
- (b) Processor: 3.0 GHz Pentium 4 or faster computer - Single Processor.
- (c) System RAM: Minimum of 1 GB (Gigabytes) of SDRAM or DDR.
- (d) Hard Disk Drive(s): 80 GB (Gigabytes) or larger.
- (e) CD-RW: Internal CD-RW, 48x Speed or faster.
- (f) 16xDVD+/RW: DVD Burner (with double layer write capability) 16x Speed or faster
- (g) I/O Ports: Must have at least one (1) Serial Port one, (1) Parallel Port, 2 USB Ports. Serial Ports must consist of UART 16550 Chip or better.
- (h) Video Display Card: PCI Interface with a minimum of 64 MB of RAM.
- (i) Monitor: 17" TFT LCD monitor.
- (j) Available Exp. Slots: System as configured above shall have at least two (2) full size PCI Slots available.
- (k) Fax/Modem: Internal Fax/Modem 56 Kbps speed, featuring 3COM or US Robotics Chipset and supporting a minimum of V.92 and MNP5 compliant. Integrated 10/100/1000 Ethernet.
- (l) Other Peripherals: Optical scroll Mouse, 101 Key Keyboard, Mouse Pad and all necessary cables.
- (m) Software Requirements: Microsoft Windows XP Professional, Microsoft Office 2003 Professional, Microsoft Project 2002 Professional, Adobe Acrobat reader, Anti-Virus software package with one year updates subscription, Win Zip and Auto Cad 2008 LT.

(2) All field offices requiring computers shall be provided with the following:

- (a) One (1) broad-band internet service account. This account will be active for the life of the project.
- (b) One (1) 600 DPI HP Laser Jet Printer (twelve (12) pages per minute or faster) with one (1) Extra Paper Tray (Legal Size)
- (c) All necessary Cabling
- (d) Storage Boxes for and Blank CDs/DVDs
- (e) Printer Table
- (f) UPS/Surge Suppressor combo

- (3) All Computer Hardware shall come with a three (3) year warranty for on-site repair or replacement. Additionally, and notwithstanding any terms of the warranty to the contrary, the Contractor is responsible for rectifying all computer problems or equipment failures within one (1) business day.

- (4) An adequate supply of blank CD's/DVD's, and paper and toner cartridges for the printer shall be provided by the Contractor, and shall be replenished by the Contractor as required by the Engineer.
- (5) It is the Contractor's responsibility to ensure that electrical service and phone connections are also available at all times; that is, the Field Office Computer(s) is to be powered and turned on twenty four (24) hours each day.

Broadband connectivity is preferred at each field office location. Please take into consideration that an extra phone line dedicated to the modem must be ordered as part of the contract unless Internet broadband connectivity, via Cable or DSL, is available at the planned field office location. Any questions regarding this policy should be directed to Raul Canabal, Assistant Commissioner of Information Technology Services at 718-391-1668.

**I. PUBLIC TELEPHONE (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. The Contractor shall provide a public telephone located on the site, where directed, for the duration of the Contract.

**J. HEAD PROTECTION (HARD HATS)**

1. The Contractor shall provide a minimum of 10 standard protective helmets for the exclusive use of Department of Design and Construction personnel and their visitors. Helmets shall be turned over to the Resident Engineer and kept in the office of the Resident Engineer.
2. Upon completion of the project, the helmets shall become the property of the Contractor.

**K. RODENT AND INSECT CONTROL**

1. **DESCRIPTION** - The General Contractor shall provide all labor, materials, plant and equipment, and incidentals required to survey and monitor rodent activity and to control any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the project area. Special attention should be paid to the following conditions or areas:
  - a. Wet areas within the project area, including all temporary structures.
  - b. All exterior and interior temporary toilet structures within the project area.
  - c. All Field Offices and shanties within the project area of all Contractors and the Department of Design and Construction (DDC).
  - d. Wherever there is evidence of food waste and/or discarded food or drink containers, in quantity, that would cause breeding of rodents or the insects herein specified.
  - e. Any other portion of the premises requiring such special attention.
2. **MATERIALS:** All materials shall be approved by the New York State Department of Environmental Conservation and comply with the New York City Health Code, OSHA and the laws, ordinances and regulations of State and Federal agencies pertaining to such chemical and/or materials
3. **PERSONNEL:** All pest control personnel must be supervised by an exterminator licensed in categories 7A & 8.
4. **METHODS**

- a. Application and dosage of all materials shall be done in strict compliance with the manufacturer's recommendations.
- b. Under the Maintenance of Site item (section 1.42.L), any unsanitary conditions, such as uncollected garbage or debris, resulting from the General Contractor's activities which will provide food and shelter to the resident rodent population shall be corrected by the General Contractor immediately after notification of such condition by the Commissioner

## 5. RODENT CONTROL WORK

- a. In wetlands, woodlands and areas adjacent to a stream, special precautions must be taken to protect water quality and to ensure the safety of other wildlife. To prevent poisoned bait from entering streams, no poisoned bait shall be used in areas within seventy-five (75) feet of all streambanks. Live traps must be used in these seventy-five (75) foot buffer zone areas and within wetland and woodland areas.
- b. In areas outside the seventy-five (75) foot zone of protection adjacent to streams, and in areas outside wetlands and woodlands, tamper proof bait stations with poisoned bait shall be placed during the period of construction and any consumed or decomposed bait shall be replenished as directed.
- c. At least one month prior to initiation of the construction work, and periodically thereafter, live traps and/or rodenticide bait in tamper proof bait stations, as directed above, shall be placed at locations that are inaccessible to pets, human beings, children and other non-target species, particularly wildlife (for example-birds) in the project area.
- d. The General Contractor shall be responsible for collecting and disposing of all trapped and poisoned rodents found in live traps and tamper proof bait stations. The General Contractor shall also be responsible for posting and maintaining signs announcing the baiting of each particular location.

The General Contractor, under his/her Maintenance of Site operations, shall be responsible for the immediate collection and disposal of any visible rodent remains found on streets or sidewalks within the project area.

- e. It is anticipated that public complaints will be addressed to the Commissioner. The General Contractor, where directed by the Commissioner, shall take appropriate actions, like baiting, trapping, proofing, etc., to remedy the source of complaint within the next six (6) hours of normal working time which is defined herein for the purposes of this section as 7 A.M. to 6 P.M. on Mondays through Saturdays.
- f. Emergency service during the regular workday hours (Monday through Friday) shall be rendered within 24 hours, if requested by the Commissioner, at no additional cost to the City.

## 6. EDUCATION & TRAINING

- a. The General Contractor shall post notices on all Construction Bulletin Boards advising workers, employees, and residents to call the Engineer's Field Office to report any infestation or outbreak of rodents, rats, mice, water beetles, roaches and fleas within the project area. The General Contractor shall provide and distribute literature pertaining to IPM techniques of rodent control to affected businesses and superintendents of nearby residential buildings to ensure their participation in maintaining their establishments free of unsanitary conditions, harborage removal and rodent proofing.
- b. Prior to application of any chemicals, the General Contractor shall furnish to the Commissioner copies or sample labels for each pesticide, antidote information, and Material Data Safety Sheets (MSDS) for each chemical used.

7. RECORDS AND REPORTS

- a. The General Contractor shall keep a record of all rodent and waterbug infestation surveys conducted by him/her and make available, upon request, to the Commissioner. The findings of each survey shall include, but not be limited to, recommended Integrated Pest Management (IPM) techniques, like baiting, trapping, proofing, etc., proposed for rodent and waterbug pest control.
- b. The General Contractor shall maintain records of all locations baited along with the type and quantity of rodenticide and insecticide bait used.

L. SITE SECURITY/PERIMETER SIGNAGE

1. In order to properly convey notice to persons entering upon a City construction site, the Contractor shall furnish and install a sign at the entrance (gates) as follows:

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**NO TRESPASSING**

**AUTHORIZED PERSONNEL ONLY**

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2. If no-construction fence exists at the site, this notice shall be conveyed by incorporating the above language into safety materials (barriers, tape, and signs).

M. MAINTENANCE OF SITE AND ADJOINING PROPERTY

1. Take over and maintain the site, after order to start work.
2. Until the work of the Contract is completed and accepted, the Contractor shall be responsible for the safety of the adjoining property, including sidewalks, paving, fences, sewers, water, gas, electric and other mains, pipes and conduits etc. The Contractor shall, at its own expense, except as otherwise specified, protect same and maintain them in least as good a condition as that in which the Contractor finds them.
3. All pavements, sidewalks, roads and approaches to fire hydrants shall be kept clear at all times, maintained and repaired to serviceable condition with materials to match existing.
4. Provide and keep in good repair all bridging and decking necessary to maintain vehicular and pedestrian traffic.
5. The Contractor shall also remove all snow and ice as it accumulates on the sidewalks within the Contract Limits Lines.

N. SAFETY PRECAUTIONS FOR CONTROL CIRCUITS

1. Control circuits, the failure of which will cause a hazard to life and property, shall comply with the New York City Dept. of Buildings, Bureau of Electrical Control requirements.

O. OBSTRUCTIONS IN DRAINAGE LINES

1. The Contractor shall be responsible for all obstructions occurring in all drainage lines, fittings and fixtures after the installations and cleaning of these drainage lines, fittings and fixtures as certified by the Resident Engineer. Roof drains shall be kept clear of any and all debris. Any stoppage shall be repaired immediately at the expense of the Contractor for General Construction Work.

P. MAINTENANCE OF PROJECT SITE

1. Take over and maintain all project areas, after order to start work.
2. Until the work of the Contract is completed and accepted, the Contractor shall be responsible for the safety of all project areas, including water, gas, electric and other mains and pipes and conduits and shall at the Contractor's own expense, except as otherwise specified, protect same and maintain them in at least as good condition as that in which the Contractor finds them.
3. All pavements, sidewalks, roads and approaches to fire hydrants shall be kept clear at all times, maintained, and if damaged, repaired to serviceable conditions with materials to match existing.
4. The Contractor shall keep the space for the Resident Engineer in a clean condition.

**Q. PROJECT SIGN AND RENDERING  
PART A – PROJECT SIGN**

1. **Responsibility:** The Contractor shall produce and install one (1) project sign which shall be posted and maintained upon the site of the project at a point and in a position where directed by the Commissioner. The Contractor shall protect the sign from damage during the continuance of work under the Contract and shall do all patching of lettering, painting and bracing thereof necessary to maintain same in first class condition and in proper position. Prior to fabrication, contractor shall submit an 8-1/2" x 11" color match print proof from the sign manufacturer of completed sign for approval by the Commissioner.
2. **Sign Quality:** The Contractor shall provide all materials required for the production of the sign as specified herein. Workmanship shall be of the best quality, free from defects and shall be produced in a timely manner.
3. **Schedule:** Upon project mobilization, the Contractor shall commence production and installation of the sign.
4. **Removal:** At the completion of all work under the Contract, the Contractor shall remove and dispose of the project sign away from the site.
5. **Sign construction:**
  - a. **Frame:** The frame shall be from quality dressed 2"x2" pine, fire retardant, pressure treated lumber, that surrounds the inside back edge of the sign. The sign shall have one (1) intermediate vertical and two (2) diagonal supports, glued and screwed for rigidity. Frame shall be painted white with two (2) coats of exterior enamel paint, prior to mounting of sign panel.
  - b. **Edging:** U-shaped, 22 gauge aluminum edging, with a white enameled finish to match sign background, shall run around entire edging of sign panel and frame. Corners shall be mitered for a tight fit. Channel dimensions shall be 1" inch (overlap to sign panel face) x 1 3/4" (or as required across frame depth) x 1" (back overlap).
  - c. **Sign Panel:** 4' x 8' panel shall be constructed in one (1) piece of 14 gauge (.0785") 6061-T6 aluminum. This panel shall be prefinished both sides with a glossy white baked-on enamel finish and be flush with edge of 2" x 2" wood frame. Samples must be submitted for approval.
  - d. **Fastening:** Fasten sign panel to wood frame using cadmium plated no. 8 sheet metal screws at 1/2" below edge of panel and 8" on center. The U-shaped aluminum channel shall be applied over the wood frame edge and fastened with cadmium plated no. 8 sheet metal screws at 12" on center around the entire perimeter.
6. **Sign Graphics:**
  - a. All visual components of the sign are in an Adobe \*.pdf file, which is provided by the

Commissioner's representative. The file is to be opened in Acrobat Professional or Acrobat Approval in order to be saved with project information. The Commissioner's representative shall insert the project name and names and titles of personnel (3 or more) and any other required information associated with the project. At no point in the update, saving or renaming of the file should it be locked by any user. The digital file shall be provided by DDC to the Contractor (on a CD or via E-mail) for printing.

- b. The DDC \*.pdf file with names provided by the commissioner shall be reproduced at the Sign Panel size of 4' x 8' on 3M High Performance Vinyl or approved equal. The sign manufacturer is required to print from the Acrobat \*.pdf provided, and must match the following colors specified by Pantone: 3025 C, 119 C, 131 C, 1805 C, 1817 C in their exact locations as indicated in the \*.pdf file, and on the DDC website: [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc).
- c. Color shall be created in a four-color process to reproduce Pantone Colors (per Pantone formula).
  1. Pantone color 3025 C (C-100, M-17, Y-0, K-51).
  2. Pantone color 119 C (C-0, M-12, Y-100, K-49).
  3. Pantone color 131 C (C-0, M-32, Y-100, K-23).
  4. Pantone color 1805 C (C-0, M-91, Y-100, K-23).
  5. Pantone color 1817 C (C-0, M-90, Y-100, K-66).

The typeface, Helvetica shall be used in all text-fields as is specified in the settings of the Acrobat \*.pdf.

Note: 3M High Performance Vinyl or equivalent shall be guaranteed for nine (9) years. Guarantee must cover fading, peeling, chipping or cracking.

**PART B – PROJECT RENDERING (REFER TO THE ADDENDUM TO THE GENERAL CONDITIONS FOR THE APPLICABILITY OF THIS ARTICLE)**

1. **Responsibility:** In addition to the Project Sign, the Contractor shall furnish and install one (1) sign showing a rendering of the project. From an approved image file provided by the DDC, the Project Rendering is to be sized, printed, and mounted in an identical manner as described in Part A above for the Project Sign. Any area of the 4' X 8' panel area not filled by the rendering shall be printed in Pantone color 3025 (c-100, M-17, y-0, K-51). A color match print proof from the sign manufacturer of the Rendering Sign printed from the supplied file is to be submitted to DDC for approval before fabrication. The Rendering Sign is to be posted at the same height as the Project Sign. Where possible, the Rendering Sign shall be mounted with a perfect match of the short sides of the rectangle so that the Rendering Sign and the Project Sign together will create one long rectangle.
2. **Removal:** At the completion of all work under the Contract, the Contractor shall remove and dispose of the project rendering away from the site.

**R. PLANT PEST CONTROL REQUIREMENTS and TREE PROTECTION REQUIREMENTS**

1. **Plant Pest Control Requirements:** The Contractor for General Construction Work (the "Contractor") and its subcontractors, including the Certified Arborist described below, shall comply with all Federal and New York State laws and regulations concerning Asian Longhorned Beetle (ALB) management, including protocols for ALB eradication and containment promulgated by the New York State Department of Agriculture and Markets (NYSDAM). The Contractor is referred to: (1) Part 139 of Title 1 NYCRR, Agriculture and Markets Law, Sections 18, 164 and 167, as amended, and (2) State Administrative Procedure Act, Section 202, as amended.

- a. All tree work performed within the quarantine areas must be performed by New York State Department of Agriculture and Markets (NYSDAM) certified entities. Transportation of all host material, living, dead, cut or fallen, inclusive of nursery stock, logs, green lumber, stumps, roots, branches and debris of a half inch or more in diameter from the quarantine areas is prohibited unless the Contractor or its sub contractor performing tree work has entered into a compliance agreement with NYSDAM. The terms of said compliance agreement shall be strictly complied with. Any host material so removed shall be delivered to a facility approved by NYSDAM. For the purpose of this contract host material shall be ALL species of trees.
  - b. Any host material that is infested with the Asian Longhorned Beetle must be immediately reported to NYSDAM for inspection and subsequent removal by either State or City contracts, at no cost to the Contractor.
  - c. Prior to commencement of tree work, the Contractor shall submit to the Commissioner a copy of a valid Asian Longhorned Beetle compliance agreement entered into with NYSDAM and the Contractor or its sub contractor performing tree work. If any host material is transported from the quarantine area the Contractor shall immediately provide the Commissioner with a copy of the New York State 'Statement of Origin and Disposition' and a copy of the receipt issued by the NYSDAM approved facility to which the host materials are transported.
  - d. Quarantine areas, for the purpose of this contract shall be defined as all five boroughs of the City of New York. In addition, prior to the start of any tree work, the Contractor shall contact the NYC Department of Parks & Recreation's Director of Landscape Management at (718) 699-6724, to determine the limits of any additional quarantine areas that may be in effect at the time when tree work is to be performed. The quarantine area may be expanded by Federal and State authorities at any time and the Contractor is required to abide by any revisions to the quarantine legislation while working on this contract. For further information please contact: NYSDAM (631) 288-1751.
2. **Tree Protection Requirements:** The Contractor shall retain a Certified Arborist, as defined by New York City Department of Parks and Recreation (NYCDPR) regulations, to provide the services described below.
- a. **Surveys and Reports:** The Certified Arborist shall, at the times indicated below, conduct a survey and prepare a plant material assessment report which includes: (1) identification, by species and pertinent measurements, of all plant material located on the project site, or in proximity to the project site, as described below, including all trees, significant shrubs and/or planting masses; (2) identification and plan for the containment of plant pests and pathogens, including the ALB, as described above; (3) evaluation of the general health and condition of any infected plant material.
  - b. **Frequency of Reports:** The Certified Arborist shall conduct a survey and provide a plant material assessment report at two (2) points in time: (1) prior to the commencement of construction work; and (2) at the time of substantial completion. In addition, for projects exceeding 24 months in duration, the Certified Arborist shall conduct a survey and prepare a report at the midpoint of construction. Copies of each plant material assessment report shall be submitted to the Resident Engineer within two (2) weeks of the survey.
  - c. **Proximity to Project Site:** Off-site trees, significant shrubs and/or planting masses shall be considered to be located in proximity to the project site under the circumstances described below.
    1. The tree trunk, significant shrub, or primary cluster of stems in a planting mass is within 50 (fifty) feet of the project's Contract Limit Lines (CLLs) or Property Lines (PLs).
    2. Any part of the tree or shrub stands within 50 (fifty) feet of: (a) a path for site access for vehicles and/or construction equipment; or (b) scaffolding to be erected for construction

activity, including façade remediation projects.

3. The Certified Arborist determines that the critical root zone (CRZ) of an off-site tree, significant shrub, or primary cluster of stems in a planting mass extends into the project site, whether or not that plant material is located within the 50-foot inclusionary perimeter as outlined above.

- d. Tree Protection Plan: The Certified Arborist shall prepare, and the Contractor shall implement, a Tree Protection Plan, for all trees that may be affected by any construction work, excavation or demolition activities, including without limitation, (1) on-site trees, (2) street trees, as defined below, (3) trees under NYCDPR jurisdiction as determined by the Department of Transportation, and (4) all trees that are located in proximity to the project site, as defined above. The Tree Protection Plan shall comply with the NYC DPR rules, regulations and specifications. The Contractor is referred to Chapter 5 of Title 56 of the Official Compilation of the Rules of the City of New York. Copies of the Tree Protection Plan shall be submitted to the Resident Engineer prior to the commencement of construction. Implementation of the Tree Protection Plan for street trees and trees under NYCDPR jurisdiction shall be in addition to any tree protection requirements specified or required for the project site.

For the purpose of this article, a "street tree" means the following: (1) a tree that stands in a sidewalk, whether paved or unpaved, between the curb lines or lateral lines of a roadway and the adjacent property lines of the project site, or (2) a tree that stands in a sidewalk and is located within 50 feet of the intersection of the project's site's property line with the street frontage property line.

3. No Separate Payment. No separate payment shall be made for compliance with Plant Pest Control Requirements or Tree Protection Requirements. The cost of compliance with Plant Pest Control Requirements and Tree Protection Requirements shall be deemed included in the Contractor's bid for the Project.

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**THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF BUILDINGS**

30-30 THOMSON AVENUE                      LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000                WEBSITE [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc)

---

---

**Contract for Furnishing all Labor and Material Necessary**

---

Contractor

Dated \_\_\_\_\_, 20\_\_\_\_

---

Approved as to Form  
Certified as to Legal Authority

---

Acting Corporation Counsel

Dated \_\_\_\_\_, 20\_\_\_\_

---

Entered in the Comptroller's Office

---

First Assistant Bookkeeper

Dated \_\_\_\_\_, 20\_\_\_\_



FMS ID: LNEMA08WS



**THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000 WEBSITE www.nyc.gov/buildnyc

Contract for Furnishing all Labor and Material Necessary and Required for:

CONTRACT NO. 1 GENERAL CONSTRUCTION WORK

**Woodstock Branch Library Renovation  
and ADA Compliance**

LOCATION: 761 East 160th Street  
BOROUGH: Bronx 10456  
CITY OF NEW YORK

National Environmental Safety Company, Inc.  
Contractor

Dated April 10, 20 14

Approved as to Form  
Certified as to Legal Authority

[Signature]  
Acting Corporation Counsel

JP  
5-31-13

Dated May 31 20 13

Entered in the Comptroller's Office

First Assistant Bookkeeper

Dated \_\_\_\_\_, 20 \_\_\_\_\_





PROJECT ID:

LNEMA08WS

**THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE  
LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000  
WEBSITE [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc)

**VOLUME 3 OF 3**

**ADDENDUM TO THE GENERAL  
CONDITIONS**

**SPECIFICATIONS**

FOR FURNISHING ALL LABOR AND MATERIALS  
NECESSARY AND REQUIRED FOR:

**Woodstock Branch Library  
Renovation and ADA Compliance**

LOCATION:  
BOROUGH:  
CITY OF NEW YORK

761 East 160th Street  
Bronx 10456

CONTRACT NO. 1

GENERAL CONSTRUCTION WORK

NYPL

RICE + LIPKA ARCHITECTS

Date:

March 14, 2013



73-039

73-039



THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

August 6, 2013

**ADDENDUM No. # 3**

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

**LNEMA08WS**

**Woodstock Library Renovation and ADA Compliance**

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This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

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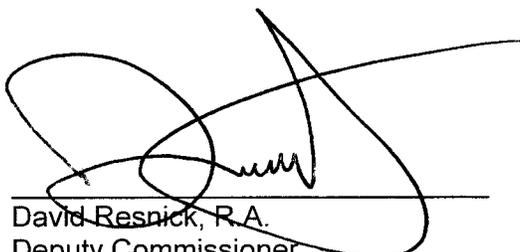
The bidder is advised that the items listed below apply to the project:

1. **Bidders Questions and Responses to Questions:**  
See Attachment A.
2. **Revisions to Drawings:**  
See Attachment B.

---

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



---

David Resnick, R.A.  
Deputy Commissioner

---

Name of Bidder

By: \_\_\_\_\_

**DDC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Library Interior Renovation and ADA Compliance**

**ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES**

No.	Bidders Questions	DDC Responses
1	Plumbing drawings indicate new gas piping. Please provide a specification for same.	Gas piping specifications in Master Spec format are part of the mechanical specifications section. See section "231123 Facility Natural-Gas Piping" included in the specifications of the Bid Set.
2	Please provide drawings P-010 and P-501 as both are referenced with the bid documents.	As indicated in the drawing list on drawing P-001.00, drawing P-501.00 is not part of the Bid Set. "P-010" is a typo and should be deleted. See Attachment B, Revisions to Drawings.

**DC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Library Renovation and ADA Compliance**

**ATTACHMENT B – REVISIONS TO THE DRAWINGS**

**REFER TO DRAWING P100.00**

1. Reference to Drawing P-010 is deleted.



THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

August 1, 2013

**ADDENDUM No. # 2**

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

**LNEMA08WS**

**Woodstock Library Renovation and ADA Compliance**

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This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

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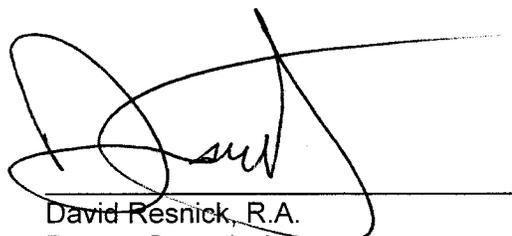
The bidder is advised that the items listed below apply to the project:

- 1. Bidders Questions and Responses to Questions:**  
See Attachment A.

---

**THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.**

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



---

David Resnick, R.A.  
Deputy Commissioner

\_\_\_\_\_  
Name of Bidder

By: \_\_\_\_\_

**DDC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Library Interior Renovation and ADA Compliance**

**ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES**

No.	Bidders Questions	DDC Responses
1	The drawing DM104 calls for partial removal for roof area. The drawing A104 calls for partial roof restoration. Both drawings show different areas. Please advise locations to be removed and area for new roof.	Drawing DM104 indicates four areas in which the slab is to be saw cut for new openings. It also shows an area where an existing access door is to be removed and four locations where existing fans are to be removed.  Drawing A104 indicates the slab to be filled in and to be covered with new roofing in areas where the existing access door and the four fans were removed. The four areas with new slab cuts are indicated to be covered with a new smoke hatch, an automatic stair smoke vent, and two roof duct penetrations (see 7/A600).
2	Reference Drawing A104: Please explain the Note: "area for future use".	This note on drawing A104 regards future equipment not included in the scope of work for this contract.



THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

August 1, 2013

**ADDENDUM No. # 2**

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

**LNEMA08WS**

**Woodstock Library Renovation and ADA Compliance**

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This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

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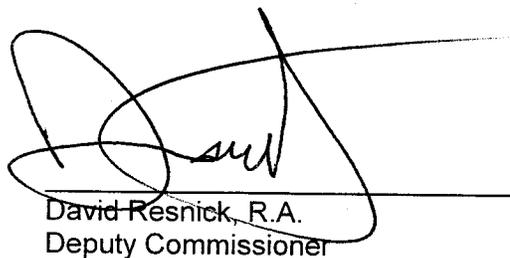
The bidder is advised that the items listed below apply to the project:

- 1. Bidders Questions and Responses to Questions:**  
See Attachment A.

---

**THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.**

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



David Resnick, R.A.  
Deputy Commissioner

\_\_\_\_\_  
Name of Bidder

By: \_\_\_\_\_

**DDC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Library Interior Renovation and ADA Compliance**

**ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES**

No.	Bidders Questions	DDC Responses
1	The drawing DM104 calls for partial removal for roof area. The drawing A104 calls for partial roof restoration. Both drawings show different areas. Please advise locations to be removed and area for new roof.	Drawing DM104 indicates four areas in which the slab is to be saw cut for new openings. It also shows an area where an existing access door is to be removed and four locations where existing fans are to be removed.  Drawing A104 indicates the slab to be filled in and to be covered with new roofing in areas where the existing access door and the four fans were removed. The four areas with new slab cuts are indicated to be covered with a new smoke hatch, an automatic stair smoke vent, and two roof duct penetrations (see 7/A600).
2	Reference Drawing A104: Please explain the Note: "area for future use".	This note on drawing A104 regards future equipment not included in the scope of work for this contract.



THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS

July 22, 2013

**ADDENDUM No. # 1**

FOR FURNISHING ALL LABOR AND MATERIAL NECESSARY AND REQUIRED FOR:

**LNEMA08WS**

**Woodstock Library Renovation and ADA Compliance**

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This addendum is issued for the purpose of amending the requirements of the Bid and Contract Documents and is hereby made a part of said Bid and Contract Documents to the same extent as though it were originally included therein.

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The bidder is advised that the items listed below apply to the project:

**1. Revised Bid Opening Date:**

The Bid Opening for the Contract described below scheduled for July 23, 2013, at 2:00pm is rescheduled to August 8, 2013 at 2:00pm.

Contract 1 – General Construction Work.

**2. Bidders Questions and Responses to Questions:**

See Attachment A.

**3. Revisions to Specifications:**

See Attachment B.

**4. Revisions to Drawings:**

See Attachment C.

**5. Revisions to the Bid Booklet:**

See Attachment D.

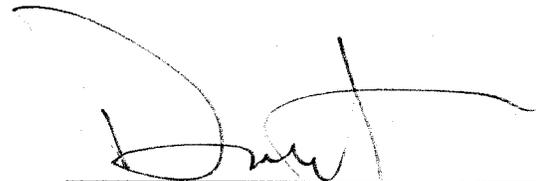
**6. Revisions to Volume 2:**

See Attachment E.

---

THIS ADDENDUM MUST BE SIGNED BY ALL BIDDERS AND ATTACHED TO THEIR BIDS.

If additional information is required, please contact the Department of Design and Construction, Contract Section at (718) 391-2200, (718) 391-1727, or by fax at (718) 391-2615.



---

David Resnick, R.A.  
Deputy Commissioner

---

Name of Bidder

By: \_\_\_\_\_

**DDC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Library Renovation and ADA Compliance**

**ATTACHMENT A - BIDDERS QUESTIONS AND DDC RESPONSES**

No.	Bidders Questions	DDC Responses
1	Is there any information on water table available?	There is no information on water table available. At a probe in the future elevator pit location, it was observed that the water level changes throughout the year. At the time of the Pre-Bid Conference site visit, the water level was at approximately 12" to 18" below the cellar floor slab.
2	Is there any information on subsurface borings available?	There is no information on borings available.
3	What is the contractor's scope for removal of furniture and equipment?	The contractor shall remove all furnishings, equipment, millwork, shelving and all associated anchors & hardware unless noted otherwise.
4	We are in need of a plumbing fixture schedule. Do you know when one might be available?	The plumbing schedule is part of the specifications section 224000 Plumbing Fixtures.
5	Drawing DM401 calls to remove existing walls, ceiling, BMS & slab @ dashed lines. For the location of mezzanine, the dashed line continues up to central column line 5. Drawings DM101M and 2/DM201 do not show any removal of the floor slab from the central column line 1 to central column line 5, besides the opening for elevator shaft. Please clarify slab removals.	Refer to drawing DM401 which indicates where the Mezzanine slab and structure as well as the ceiling in the first floor under the Mezzanine south of column line 5 are to be removed. The Mezzanine floor slab occurs only in the area between column 5 and 6' north of column 4. The area south of this does not have a floor slab, only a GWB ceiling over the first floor. The demolition drawings indicate different scopes of removal of floor slab (1/DM101M) versus the scope of removal of ceiling (2/DM201).

**DDC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Library Interior Renovation and ADA Compliance**

**ATTACHMENT B – REVISIONS TO THE SPECIFICATIONS**

The following Section has been modified:

- Specification Section 087100 DOOR HARDWARE (Revised as per below)

1. SCHEDULE OF FINISH HARDWARE:

- a. Hardware Set #100 (door 1.06): Add door contact and audible alarm.
- b. Hardware Set #104 (door 1.01): Delete mag locks.
- c. Hardware Set #108 (door 2.02): Add card reader.

**DC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Library Renovation and ADA Compliance**

**ATTACHMENT C – REVISIONS TO THE DRAWINGS**

**REFER TO DRAWING A-101**

1. Add note: "Contractor to provide architectural concrete everywhere where finished concrete will remain visible after construction: at the new entry slab, entry ramp, side ledge, stairs, etc."
2. Add note: "Contractor to provide saw-cut control joints at every change of slope and, in addition to these, one cross cut in the middle of the larger ramp, one extending the line of the base of the ramp to the west and one extending the one of the cutout for the cellar stair to the east."
3. Add note: "Exterior Sidewalk Work at Sprinkler Supply Curb Valve: Contractor to keep any disturbance of the street or sidewalk due to the new connection of the 4" sprinkler supply to the main in the street to a minimum and after the work has been finished, to repair and restore to its original function and appearance."

**REFER TO DRAWING A-202**

1. Drawing note states that light fixtures are to be mounted directly to the ceiling. Note that these are pendant fixtures. Refer to building section A-402 for mounting height of fixture (12'-10" T.O fixture).

**REFER TO DRAWING A-711**

1. Legend is revised to include new radiators in Toilet Rooms 106, 107 and 201 (elevations 4/A711, 8/A711 and 9/A711).

**REFER TO DRAWING A-721**

1. Detail 6/A721: Ceiling height for the new GWB ceiling on the 2<sup>nd</sup> floor is revised to read 13'-5 1/2".

**REFER TO DRAWING A-903**

1. New Refrigerator in Staff Lounge: Provide a 1/4" polypropylene line water supply for the 3rd floor refrigerator/ ice maker, routed through millwork from the cold water stop valve under the nearby sink.

**REFER TO DRAWING A-981**

1. Details 7/A981 and 13/A981 were not printed correctly. Refer to elevations 4/A502 and 1/A300 for reference.
2. Add: Contractor to provide two additional signs, similar to signs 12/A981, to be placed at cellar and 3<sup>rd</sup> floor level. Signs to be 1'-1" square and only contain the Active Design signage (graphic of person walking up the stairs and the text "Elevate Yourself! Take the Stairs.").

**REFER TO DRAWING E-101**

1. Add note: "Provide for doorbell on exterior of building and for chimes, associated junction box transformer and associated wiring. Doorbell push button to be NuTone PB41LBR Wired Push Button, finish to be Oil Rubbed Bronze – or approved equal. For location of doorbell see exterior elevation 1/A-300. Provide for doorbell chime and associated wiring in Reading Room 110. Chime to be NuTone LA39WH – or approved equal. Paint chime to match adjacent wall color."

**REFER TO DRAWING E-102**

1. Add note: "Provide for doorbell chimes and associated wiring in Reading Room 211, Office 204 and Office 205. Chimes to be NuTone LA39WH – or approved equal. Paint chime to match adjacent wall color".

**REFER TO DRAWING E-103**

1. Add note: "Provide for doorbell chimes and associated wiring in Staff Lounge 305. Chime to be NuTone LA39WH – or approved equal. Paint chime to match adjacent wall color"

**REFER TO DRAWING SC-001**

1. Delete item #5 listed under the "General Notes". The \$3,000 allowance is not required.

**All drawings listed below replace drawings of original Bid Set (03.11.2013):**

**REFER TO DRAWING E-100 (Addendum 1, 07.08.2013)**

1. Electrical equipment rearranged in incoming service room to avoid existing to remain overhead pipes.

**REFER TO DRAWING M-001 (Addendum 1, 07.08.2013)**

1. Minor clarifying revisions to the abbreviation list.

**REFER TO DRAWING M-100 (Addendum 1, 07.08.2013)**

1. Clarified fire damper requirements.
2. Clarified existing heating to remain in gas and electric rooms.

**REFER TO DRAWING M-600 (Addendum 1, 07.08.2013)**

1. Clarified notes and model numbers of exhaust grilles to be used in the cellar.

**REFER TO DRAWING P-001 (Addendum 1, 07.08.2013)**

1. Clarification to symbol list.

**REFER TO DRAWING P-100 (Addendum 1, 07.08.2013)**

1. Curb valve shown.
2. Clarified piping.

**REFER TO DRAWING P-400 (Addendum 1, 07.08.2013)**

1. Curb valve shown.

**REFER TO DRAWING P-401 (Addendum 1, 07.08.2013)**

1. Curb valve shown.

**REFER TO DRAWING P-500 (Addendum 1, 07.08.2013)**

1. Curb valve shown.

**REFER TO DRAWING SP-100 (Addendum 1, 07.08.2013)**

1. Clarified sprinkler piping.
2. Corrected several heads in cellar passageway to concealed type.
3. Deleted unnecessary piping related to previously removed sprinkler scope.

**REFER TO DRAWING SP-400 (Addendum 1, 07.08.2013)**

1. Clarified sprinkler scope as being limited to the cellar and showed curb valve.

**REFER TO DRAWING TE-101 (Addendum 1, 07.08.2013)**

1. Added room numbers and column grid.

**REFER TO DRAWING TE-102 (Addendum 1, 07.08.2013)**

1. Added room numbers and column grid.

**REFER TO DRAWING TE-103 (Addendum 1, 07.08.2013)**

1. Added room numbers and column grid.

**REFER TO DRAWING TE-104 (Addendum 1, 07.08.2013)**

2. Added room numbers and column grid.

**DDC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Branch Library Renovation and ADA Compliance**

**ATTACHMENT A – REVISIONS TO THE BID BOOKLET**

Bid Booklet: The Bid Booklet is amended as set forth below.

- Table of Contents: Delete Item #2, entitled “M/WBE Program: Subcontractor Utilization Plan”, and replace it with “M/WBE Program: M/WBE Utilization Plan”.
- Special Notice to Bidders: Bid Submission Requirements: Under Bid Envelope #1, delete “M/WBE Subcontractor Utilization Plan (if participation goals have been established)”, and replace it with “Schedule B: M/WBE Utilization Plan (if Participation Goals have been established)”.
- Bid Form: Delete the pages of Bid Form (pages 13) for insertion of the Total Bid Price, as well as signature by the bidder, and replace it with the new pages for insertion of the Total Bid Price attached to this Addendum (pages 13-R).
- MWBE Program: Subcontractor Utilization Plan: Delete the section (pages 5,6,7,8 and 9) entitled “M/WBE Program: Subcontractor Utilization Plan”, and replace it with the new section entitled “M/WBE Program: M/WBE Utilization Plan” attached to this Addendum (pages 5-R, 6-R, 7-R, 8-R, 9-R, 9a).
- Bidder’s Identification of Subcontractors: Delete the language under the heading “PLEASE NOTE” from the form entitled “Bidder’s Identification of Subcontractors”, and replace it with the new language set forth below.

PLEASE NOTE: for any contract that is subject to M/WBE Participation Goals under Section 6-129 of the Administrative Code of the City of New York, if the bidder’s intention to use its own forces to do any of the above-referenced work would result in Bidder’s failure to attain the Participation Goals identified in the M/WBE Utilization Plan, the bid will be non-responsive unless the bidder requests and obtains a full or partial waiver of the Participation Goals (M/WBE Utilization Plan, Part III) in advance of bid submission. For more information see Notice to All Prospective Contractors, Participation by Minority-Owned and Women-Owned Business Enterprises in City Procurement.

- Bid Breakdown Form: Delete pages 21-21, 21-40, and 21-41 and replace with revised pages 21-21-R, 21-40-R, and 21-41-R, included with this Addendum.

BID FORM

PROJECT ID: LNEMA08WS

TOTAL BID PRICE: In the space provided below, the Bidder shall indicate the total bid price in figures.

A. LUMP SUM PRICE - Total price for all labor and material for all required work, excluding items (B) and (C) set forth below. Total Price shall include all costs and expenses, i.e. labor, material overhead and profit for all the Work, described and shown in the drawings and specifications.

Total Price For Labor

Total Price for Material Sold and Delivered

\$ \_\_\_\_\_ +

\$ \_\_\_\_\_

Total Price for Item A= \$ \_\_\_\_\_

B. ALLOWANCE for Incidental Asbestos Abatement (Section 028013 of the Specifications)

\$30,000.00

C. AMOUNT for Proprietary Items (pages 2a-2f)

\$68,261.00

TOTAL BID PRICE (Add A + B + C) ( a/k/a BID PROPOSAL)

\$ \_\_\_\_\_

BIDDER'S SIGNATURE AND AFFIDAVIT

\* SUBCONTRACTOR IDENTIFICATION: You MUST complete and submit the form entitled "Bidder's Identification of Subcontractors" (page 17) at the time you submit your bid. You must submit this form in a separate, sealed envelope (BID ENVELOPE #2). In the event an award of contract is not made to the Bidder, the Bidder hereby authorizes the Agency to shred the form entitled "Bidder's Identification of Subcontractors". Yes No

\* M/WBE UTILIZATION PLAN: By signing its bid in the space below, the bidder agrees to the Vendor Certification and Required Affirmations set forth below, unless a full waiver of the Participation Goals is granted. The Vendor Certification and Required Affirmations will be deemed to satisfy the requirement to complete Section V of Part II of Schedule B: M/WBE Utilization Plan.

Section V: Vendor Certification and Required Affirmations: I hereby: 1) acknowledge my understanding of the M/WBE participation requirements as set forth in this Contract and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York and the rules promulgated thereunder; 2) affirm that the information supplied in support of the M/WBE Utilization Plan is true and correct; 3) agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract; 4) agree and affirm that it is a material term of this Contract that the Vendor will award the total dollar value of the M/WBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such goals are modified by the Agency; and 5) agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or If a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms.

Bidder: \_\_\_\_\_

By: \_\_\_\_\_ (Signature of Partner or corporate officer)

Attest: (Corporate Seal)

Secretary of Corporate Bidder

Affidavit on the following page should be subscribed and sworn to before a Notary Public

## M/WBE PROGRAM

### M/WBE UTILIZATION PLAN

**M/WBE Program Requirements:** The requirements for the M/WBE Program are set forth on the following pages of this Bid Booklet, in the section entitled "Notice to All Prospective Contractors".

**Schedule B: M/WBE Utilization Plan:** Schedule B: M/WBE Utilization Plan for this Contract is set forth in this Bid Booklet on the pages following the section entitled "Notice to All Prospective Contractors". The M/WBE Utilization Plan (Part I) indicates whether Participation Goals have been established for this Contract. If Participation Goals have been established for this Contract, the bidder must submit an M/WBE Utilization Plan (Part II) with its bid.

**Waiver:** The bidder may seek a full or partial pre-award waiver of the Participation Goals in accordance with the "Notice to All Prospective Contractors" (See Part A, Section 10). The bidder's request for a waiver must be submitted at least seven (7) calendar days prior to the bid date. Waiver requests submitted after the deadline will not be considered. The form for requesting a waiver of the Participation Goals is set forth in the M/WBE Utilization Plan (Part III).

**Rejection of the Bid:** The bidder must complete Schedule B: M/WBE Utilization Plan (Part II) set forth in this Bid Booklet on the pages following the section entitled "Notice to All Prospective Contractors". A Schedule B submitted by the bidder which does not include the Vendor Certification and Required Affirmations (See Section V of Part II) will be deemed to be non-responsive, unless a full waiver of the Participation Goals is granted (Schedule B, Part III). In the event that the City determines that the bidder has submitted a Schedule B where the Vendor Certification and Required Affirmations are completed but other aspects of the Schedule B are not complete, or contain a copy or computation error that is at odds with the Vendor Certification and Required Affirmations, the bidder will be notified by the Agency and will be given four (4) calendar days from receipt of notification to cure the specified deficiencies and return a completed Schedule B to the Agency. Failure to do so will result in a determination that the Bid is non-responsive. Receipt of notification is defined as the date notice is emailed or faxed (if the bidder has provided an email address or fax number), or no later than five (5) calendar

**Impact on LBE Requirements:** If Participation Goals have been established for the participation of M/WBEs, the contractor is not required to comply with the Locally Based Enterprise Program ("LBE"). The LBE Program is set forth in Article 67 of the Contract.

Tax ID #: \_\_\_\_\_

APT E-  
PIN#: 85013B0094

Contract # 1 - General Construction Work

## SCHEDULE B - M/WBE Utilization Plan

### Part I: M/WBE Participation Goals

Part I to be completed by contracting agency

#### Contract Overview

APT E-Pin # 85013B0094 FMS Project ID#: LNEMA08WS

Project Title/Agency Woodstock Branch Library Renovation and ADA Compliance

PIN # 8502013LN002C

Bid/Proposal  
Response Date: August 08, 2013

Contracting Agency Department of Design and Construction

Agency Address 30-30 Thomson Avenue City Long Island City State NY Zip Code 11101

Contact Person Norma Negrón Title MWBE Liaison & Compliance Analyst

Telephone # (718) 391-1502 Email negronn@ddc.nyc.gov

#### Project Description *(attach additional pages if necessary)*

This Project consists of the full renovation of the first and second floor of this historic branch library designed by McKim, Mead and White, as well as two necessary measures to make the library accessible: the insertion of a new elevator and the replacement of an enclosed egress stair with a new open stair. The project scope includes new lighting in the renovated areas, a new sprinkler system for the cellar and around the open stair, improvements to the fire alarm system, ADA compliance, including the installation of an elevator, and upgrades to the building infrastructure and security systems.

#### M/WBE Participation Goals for Services

*Enter the percentage amount for each group or for an unspecified goal.*

Prime Contract Industry: Construction

Group	Percentage	
<u>Unspecified</u>	<u>20</u>	<u>%</u>
or		
<u>Black American</u>	<u>Unspecified</u>	<u>%</u>
<u>Hispanic American</u>	<u>Unspecified</u>	<u>%</u>
<u>Asian American</u>	<u>Unspecified</u>	<u>%</u>
<u>Women</u>	<u>Unspecified</u>	<u>%</u>
<b>Total Participation Goals</b>	<b>20</b>	<b>%</b>

Line 1

Tax ID #: \_\_\_\_\_

APT E-

PIN#: \_\_\_\_\_

**SCHEDULE B - Part II: M/WBE Participation Plan**

Part II to be completed by the bidder/proposer:

Please note: For Non-M/WBE Prime Contractors who will NOT subcontract any services and will self-perform the entire contract, you must obtain a FULL waiver by completing the Waiver Application on pages 9 and 9a and timely submitting it to the contracting agency pursuant to the Notice to Prospective Contractors. Once a FULL WAIVER is granted, it must be included with your bid or proposal and you do not have to complete or submit this form with your bid or proposal.

Section I: Prime Contractor Contact Information			
Tax ID #	_____	FMS Vendor ID #	_____
Business Name	_____	Contact Person	_____
Address	_____		
Telephone #	_____	Email	_____

**Section II: M/WBE Utilization Goal Calculation: Check the applicable box and complete subsection.**

PRIME CONTRACTOR ADOPTING AGENCY M/WBE PARTICIPATION GOALS				
<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE Participation Goals.	Total Bid/Proposal Value		Agency Total Participation Goals (Line 1, Page 1)	Calculated M/WBE Participation Amount
<p>Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.</p> <p>Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.</p>	\$	X	=	\$ Line 2

PRIME CONTRACTOR OBTAINED PARTIAL WAIVER APPROVAL: ADOPTING MODIFIED M/WBE PARTICIPATION GOALS				
<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Modified M/WBE Participation Goals.	Total Bid/Proposal Value		Adjusted Participation Goal (From Partial Waiver)	Calculated M/WBE Participation Amount
<p>Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.</p> <p>Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.</p>	\$	X	=	\$ Line 3

**Section III: M/WBE Utilization Plan: How Proposer/Bidder Will Fulfill M/WBE Participation Goals. Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation. Check applicable box. The Proposer or Bidder will fulfill the M/WBE Participation Goals:**

As an M/WBE Prime Contractor that will self-perform and/or subcontract to other M/WBE firms a portion of the contract the value of which is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non-M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals. Please check all that apply to Prime Contractor:  
 MBE  WBE

As a Qualified Joint Venture with an M/WBE partner, in which the value of the M/WBE partner's participation and/or the value of any work subcontracted to other M/WBE firms is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals.

As a non M/WBE Prime Contractor that will enter into subcontracts with M/WBE firms the value of which is at least the amount located on Lines 2 or 3 above, as applicable.

**Section IV: General Contract Information**

What is the expected percentage of the total contract dollar value that you expect to award in subcontracts for services, regardless of M/WBE status? % \_\_\_\_\_

*Enter brief description of the type(s) and dollar value of subcontracts for all any services you plan on subcontracting if awarded this contract. For each item, indicate whether the work is designated for participation by MBEs and/or WBEs and the time frame in which such work is scheduled to begin and end. Use additional sheets if necessary.*

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_
- 11. \_\_\_\_\_
- 12. \_\_\_\_\_
- 13. \_\_\_\_\_
- 14. \_\_\_\_\_
- 15. \_\_\_\_\_
- 16. \_\_\_\_\_
- 17. \_\_\_\_\_

✓ **Scopes of Subcontract Work**

**Section V: Vendor Certification and Required Affirmations**

I hereby:  
1) acknowledge my understanding of the M/WBE participation requirements as set forth herein and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York (Section 6-129), and the rules promulgated thereunder;  
2) affirm that the information supplied in support of this M/WBE Utilization Plan is true and correct;  
3) agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract  
4) agree and affirm that it is a material term of this Contract that the Vendor will award the total dollar value of the M/WBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such goals are modified by the Agency; and  
5) agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms.

Signature \_\_\_\_\_  
Print Name \_\_\_\_\_

Date \_\_\_\_\_  
Title \_\_\_\_\_

**SCHEDULE B – PART III – REQUEST FOR WAIVER OF M/WBE PARTICIPATION REQUIREMENT**

**Contract Overview**

Tax ID # \_\_\_\_\_ FMS Vendor ID # \_\_\_\_\_  
 Business Name \_\_\_\_\_  
 Contact Name \_\_\_\_\_ Telephone # \_\_\_\_\_ Email \_\_\_\_\_  
 Type of Procurement  Competitive Sealed Bids  Other Bid/Response Due Date \_\_\_\_\_  
 APT E-PIN # (for this procurement): \_\_\_\_\_ Contracting Agency: \_\_\_\_\_

**M/WBE Participation Goals as described in bid/solicitation documents**

\_\_\_\_\_ % Agency M/WBE Participation Goal

**Proposed M/WBE Participation Goal as anticipated by vendor seeking waiver**

\_\_\_\_\_ % of the total contract value anticipated in good faith by the bidder/proposer to be subcontracted for services and/or credited to an M/WBE Prime Contractor or Qualified Joint Venture.

**Basis for Waiver Request: Check appropriate box & explain in detail below (attach additional pages if needed)**

- Vendor does not subcontract services, and has the capacity and good faith intention to perform all such work itself with its own employees.
- Vendor subcontracts *some* of this type of work but at a *lower* % than bid/solicitation describes, and has the capacity and good faith intention to do so on this contract. (Attach subcontracting plan outlining services that the vendor will self-perform and subcontract to other vendors or consultants.)
- Vendor has other legitimate business reasons for proposing the M/WBE Participation Goal above. Explain under separate cover.

**References**

List 3 most recent contracts performed for NYC agencies (if any). Include information for each subcontract awarded in performance of such contracts. Add more pages if necessary.

CONTRACT NO.	AGENCY	DATE COMPLETED
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____
CONTRACT NO. _____	AGENCY _____	DATE COMPLETED _____
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____
CONTRACT NO. _____	AGENCY _____	DATE COMPLETED _____
Total Contract Amount \$ _____	Total Amount Subcontracted \$ _____	
Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____	Item of Work Subcontracted and Value of subcontract _____

List 3 most recent contracts performed for other entities. Include information for each subcontract awarded in performance of such contracts. Add more pages if necessary.

(Complete ONLY if vendor has performed fewer than 3 New York City contracts.)

TYPE OF Contract \_\_\_\_\_ ENTITY \_\_\_\_\_ DATE COMPLETED \_\_\_\_\_  
 Manager at entity that hired vendor (Name/Phone No./Email) \_\_\_\_\_  
 Total Contract Amount \$ \_\_\_\_\_ Total Amount Subcontracted \$ \_\_\_\_\_  
 Type of Work Subcontracted \_\_\_\_\_

TYPE OF Contract \_\_\_\_\_ AGENCY/ENTITY \_\_\_\_\_ DATE COMPLETED \_\_\_\_\_  
 Manager at agency/entity that hired vendor (Name/Phone No./Email) \_\_\_\_\_  
 Total Contract Amount \$ \_\_\_\_\_ Total Amount Subcontracted \$ \_\_\_\_\_  
 Item of Work Subcontracted and Value of subcontract \_\_\_\_\_ Item of Work Subcontracted and Value of subcontract \_\_\_\_\_

TYPE OF Contract \_\_\_\_\_ AGENCY/ENTITY \_\_\_\_\_ DATE COMPLETED \_\_\_\_\_  
 Manager at entity that hired vendor (Name/Phone No./Email) \_\_\_\_\_  
 Total Contract Amount \$ \_\_\_\_\_ Total Amount Subcontracted \$ \_\_\_\_\_  
 Item of Work Subcontracted and Value of subcontract \_\_\_\_\_ Item of Work Subcontracted and Value of subcontract \_\_\_\_\_

**VENDOR CERTIFICATION:** I hereby affirm that the information supplied in support of this waiver request is true and correct, and that this request is made in good faith.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

*Shaded area below is for agency completion only*

**AGENCY CHIEF CONTRACTING OFFICER APPROVAL**

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**CITY CHIEF PROCUREMENT OFFICER APPROVAL**

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Waiver Determination**

Full Waiver Approved:   
 Waiver Denied:   
 Partial Waiver Approved:   
 Revised Participation Goal: \_\_\_\_\_ %



NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

**CONTRACTOR BID BREAKDOWN FORM**

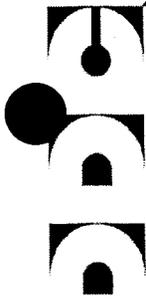
PROJECT TITLE  
PROJECT LOCATION  
BIDDER:

NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
101400	<b>DIVISION 10 - SPECIALTIES</b> <i>Identifying Devices</i>  Fixed Tackboards Homasote tack board: 3/4" MDF or plywood, 1/4" forbo tack board, 1" x 1/4" ptd wood trim, 1/8" & 1/16" reveal - 7'0" x 7'0" @ first floor - 6'9" x 5'6" @ second floor Interior signage Basement Ground floor Second floor Third floor Front entrance New 1'-0" x 1'-9" bronze plaque New tamper resistant sign location for public hours 54" x 96" public notices board, MDF/FORBO w/wood trim @ lobby 101 1'-1" x 4'-5" brochure beam: 1/8" steel plate bolted to wood floor, 1/8" bent steel beam @ vestibule  <b>subtotal</b>		EA EA SF SF SF SF EA EA EA LF					
102114	<b>Toilet Partitions</b> Toilet partition - Stainless Steel @ first floor Urinal partition - first floor  <b>subtotal</b>		EA EA					
102213	<b>Wire Mesh Partitions</b> Wire Mesh Partitions  <b>subtotal</b>		LF					



NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

**CONTRACTOR BID BREAKDOWN FORM**

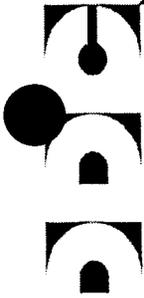
PROJECT TITLE  
PROJECT LOCATION  
BIDDER:

NEW YORK PUBLIC LIBRARY - WOODSTOCK BRANCH RENOVATION  
761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	3D - Data outlets (floor box)		EA					
	Tel/Data outlets - 1V/2D outlet		EA					
	Analog voice outlet - 1A-D		EA					
	TV outlet		EA					
	Telephone outlet		EA					
	Tel/Data outlets		EA					
	Tel/Data outlets above ceiling		EA					
	WAP - 2 port wireless access point		EA					
	WLAN - Data signal - receptor		EA					
	Tel/Data 1" empty conduit		LF					
	1" emt + grounding conductor		LF					
	4" sleeve to corridor for cables running		EA					
	2" conduit sleeve to exterior wall for station cables		EA					
	4" conduit sleeve thru concrete slab		EA					
	<b>subtotal</b>							
271000	<b>Communications Cabling</b>							
	Allow for Cat 6 Cabling		If					
	<b>subtotal</b>							
280000	<b>DIVISION 28 - ELECTRONIC SAFETY AND SECURITY</b>							
281000	<b>Security System</b>							
	Security rack: 1-Star (hook ups to LAN), 17" monitor, DVR, USB control module, UTP receiver HUB.		LS					
	IT rack 1 & 2		LS					
	Battery backup		EA					
	SDF - security distribution frame: security device, lock power supply, cctv power supply, etc.		EA					
	4' x 8' x 3/4" fire-rated plywood		SF					



NEW YORK CITY DEPARTMENT OF  
DESIGN + CONSTRUCTION

CONTRACTOR BID BREAKDOWN FORM

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761 160th Street, Bronx, New York 10465

FMS ID NUMBER  
CLIENT AGENCY

LNEMA08WS  
NYPL

CSI Number	Description	Quantity	Unit	Unit Cost of Material	Total Cost of Material	Unit Cost of Labor	Total Cost of Labor	Total Cost: Materials and Labor
	New 8" x 8" x 96" trough for security cables		Ea					
	New 6" x 6" x 24" trough for security cables		Ea					
	Motion sensor - wall mounted		EA					
	Motion sensor - clg. Mounted		EA					
	Door contact		LS					
	Distress button		LS					
	Security camera:							
	- wall mounted		EA					
	- wall mounted - PAN / tilt camera		EA					
	- ceiling mounted		EA					
	- pedestal mounted		EA					
	C / ELR / PT: card reader - Tyco RM2L-PH (see Bid Booklet page 2e)		EA					
	C / ELR / PT: card reader - Install plus delivery, overhead, tax		EA					
	IDS - intrusion detection system keypad		EA					
	USB Control Module - American Dynamics ADACSNET (see Bid Booklet page 2e)		EA					
	USB Control Module - Install plus delivery, overhead, tax		EA					
	Control Relay		EA					
	Maglock at shoe (failsafe and hook up to fire alarm) @ main entrance		EA					
	Type W: blue warning light @ vestibule		EA					
	Security conduit & wiring		LF					
	Integrator		LS					
	1" conduit sleeve thru concrete slab and core drill for entry vestibule		EA					
	3/4" conduit sleeve thru concrete slab and core drill for duress button		EA					

**DDC PROJECT #: LNEMA08WS**

**PROJECT NAME: Woodstock Branch Library Renovation and ADA Compliance**

**ATTACHMENT B – REVISIONS TO VOLUME 2**

Contract: The Contract is amended as set forth below.

- Delete Article 77, entitled “Participation by Minority-Owned and Women-Owned Business Enterprises in City Procurement”, in its entirety, and replace it with new Article 77. New Article 77 is IDENTICAL in all respects to the section entitled “Notice to All Prospective Contractors: Participation by Minority-Owned and Women-Owned Business Enterprises in City Procurement” attached to this Addendum.
  
- Prevailing Wages:  
The latest Prevailing Wage Schedule is included with this Addendum.

**NOTICE TO ALL PROSPECTIVE CONTRACTORS**

**PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS  
ENTERPRISES IN CITY PROCUREMENT**

**ARTICLE I. M/WBE PROGRAM**

Local Law No. 129 of 2005 added and Local Law 1 of 2013 amended Section 6-129 of the Administrative Code of the City of New York (hereinafter "Section 6-129"). Section 6-129 establishes the program for participation in City procurement ("M/WBE Program") by minority-owned business enterprises ("MBEs") and women-owned business enterprises ("WBEs"), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6-129, the intent of the program is to address the impact of discrimination on the City's procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services ("DSBS") promulgated thereunder.

**If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the "M/WBE Utilization Plan"), and are detailed below. The Contractor must comply with all applicable MBE and WBE requirements for this Contract.**

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129. Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts. Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

**PART A**

**PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD  
AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS**

1. The **MBE and/or WBE Participation Goals** established for this Contract or Task Orders issued pursuant to this Contract, ("**Participation Goals**"), as applicable, are set forth on Schedule B, Part I to this Contract (see Page 1, line 1 Total Participation Goals) or will be set forth on Schedule B, Part I to Task Orders issued pursuant to this Contract, as applicable.

The **Participation Goals** represent a percentage of the total dollar value of the Contract or Task Order, as applicable, that may be achieved by awarding subcontracts to firms certified with New York City Department of Small Business Services as MBEs and/or WBEs, and/or by crediting the participation of prime contractors and/or qualified joint ventures as provided in Section 3 below, unless the goals have been waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

2. If **Participation Goals** have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the **Participation Goals**, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

3. If **Participation Goals** have been established for this Contract or Task Order issued pursuant to this Contract, a Contractor that is an MBE and/or WBE shall be permitted to count its own participation toward fulfillment of the relevant **Participation Goal**, provided that in accordance with Section 6-129 the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that the Contractor pays to direct subcontractors (as defined in Section 6-129(c)(13)), and provided further that a Contractor that is certified as both an MBE and a WBE may count its own participation either toward the goal for MBEs or the goal for WBEs, but not both.

A Contractor that is a qualified joint venture (as defined in Section 6-129(c)(30)) shall be permitted to count a percentage of its own participation toward fulfillment of the relevant **Participation Goal**. In accordance with Section 6-129, the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as

applicable, any amounts that Contractor pays to direct subcontractors, and then multiplying the remainder by the percentage to be applied to total profit to determine the amount to which an MBE or WBE is entitled pursuant to the joint venture agreement, provided that where a participant in a joint venture is certified as both an MBE and a WBE, such amount shall be counted either toward the goal for MBEs or the goal for WBEs, but not both.

4. A. If **Participation Goals** have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals**, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre-award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.

B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE **Participation Goals**, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part II (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified **Participation Goals** by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals** that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed nonresponsive.

(ii) **Participation Goals** on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If **Participation Goals** have been established on a Task Order, a contractor shall be required to submit a Schedule B - M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. The contractor must engage in good faith efforts to meet the **Participation Goals** as established for the Task Order unless Agency has granted the contractor a pre-award waiver of the Participation Goals in accordance with Section 6-129 and Part A, Section 10 below.

C. **THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART II). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS (SEE SECTION V OF PART II) WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART III). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.**

5. Where an M/WBE Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multiyear contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor to report periodically about the contracts awarded by its direct subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at**

the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.

6. MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the **Participation Goals**. Such certification must occur prior to the firms' commencement of work. A list of MBE and WBE firms may be obtained from the DSBS website at [www.nyc.gov/buycertified](http://www.nyc.gov/buycertified), by emailing DSBS at [buyer@sbs.nyc.gov](mailto:buyer@sbs.nyc.gov), by calling (212) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting [www.nyc.gov/getcertified](http://www.nyc.gov/getcertified), emailing [MWBE@sbs.nyc.gov](mailto:MWBE@sbs.nyc.gov), or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).

7. Where an **M/WBE Utilization Plan** has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to, the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.

8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's **M/WBE Utilization Plan**, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its **M/WBE Utilization Plan** in accordance with Section 6-129 and Part A, Section 11 below.

9. Where an **M/WBE Utilization Plan** has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or \$500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the **Participation Goals** should be modified.

10. Pre-award waiver of the **Participation Goals**. (a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the **Participation Goals** in accordance with Section 6-129, which requests that Agency change one or more **Participation Goals** on the grounds that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its **M/WBE Utilization Plan**.

(b) To apply for a full or partial waiver of the **Participation Goals**, a bidder, proposer, or contractor, as applicable, must complete Part III (Page 5) of Schedule B and submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing to the Agency by email at [poped@ddc.nyc.gov](mailto:poped@ddc.nyc.gov) or via facsimile at (718) 391-1886. Bidders, proposers, or contractors, as applicable, who have submitted requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an Agency response will be provided by close-of-business on the business day before such weekend or holiday date.

(c) If the Agency determines that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.

(d) Agency may grant a full or partial waiver of the **Participation Goals** to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of subcontracting in its **M/WBE Utilization Plan**. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the **Participation Goals**. In making such determination, Agency may consider whether the **M/WBE Utilization Plan** is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, whether the bidder, proposer or contractor, as applicable, has made efforts to form a joint venture with a certified firm, and whether the bidder, proposer, or contractor, as applicable, has made good faith efforts to identify other portions of the Contract that it intends to subcontract.

11. **Modification of M/WBE Utilization Plan.** (a) A Contractor may request a modification of its **M/WBE Utilization Plan** after award of this Contract. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission.** The Agency may grant a request for Modification of a Contractor's **M/WBE Utilization Plan** if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the **Participation Goals**. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

- (i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;
- (ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;
- (iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;
- (iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the **M/WBE Utilization Plan**, and for which the Contractor claims an inability to retain MBEs or WBEs;
- (v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;
- (vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;
- (vii) Timely written requests for assistance made by the Contractor to Agency's **M/WBE liaison officer** and to **DSBS**;
- (viii) Description of how recommendations made by **DSBS** and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

Agency's **M/WBE officer** shall provide written notice to the Contractor of the determination.

(b) The Agency may modify the **Participation Goals** when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its **M/WBE Utilization Plan** would be awarded to subcontractors.

12. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an **M/WBE Utilization Plan** and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Participation Goals**, the Contractor will not be deemed in violation of the **M/WBE Program requirements** for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.

13. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its **M/WBE Utilization Plan**, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.

14. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

### **PART B: MISCELLANEOUS**

1. The Contractor shall take notice that, if this solicitation requires the establishment of an **M/WBE** Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the **M/WBE** Utilization Plan.

2. Pursuant to DSBS rules, construction contracts that include a requirement for an **M/WBE** Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.

3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.

4. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).

5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required **Participation Goals**.

### **ARTICLE II. ENFORCEMENT**

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.

2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any **M/WBE** Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering the Contractor an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.

3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to, any **M/WBE** Utilization Plan, Agency may determine that one of the following actions should be taken:

- (a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;
- (b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;
- (c) making a finding that the Contractor is in default of the Contract;
- (d) terminating the Contract;
- (e) declaring the Contractor to be in breach of Contract;
- (f) withholding payment or reimbursement;
- (g) determining not to renew the Contract;
- (h) assessing actual and consequential damages;
- (i) assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the

Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;

- (j) exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or
- (k) taking any other appropriate remedy.

4. If an **M/WBE** Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to fulfill its **Participation Goals** contained in its **M/WBE** Utilization Plan or the **Participation Goals** as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the **Participation Goals** and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the **Participation Goals**, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.

5. Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6-129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.

6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.

7. The Contractor's record in implementing its **M/WBE** Utilization Plan shall be a factor in the evaluation of its performance. Whenever Agency determines that a Contractor's compliance with an **M/WBE** Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in VENDEX as caution data.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

LABOR LAW §220 PREVAILING WAGE SCHEDULE

Workers, Laborers and Mechanics employed on a public work project must receive not less than the prevailing rate of wage and benefits for the classification of work performed by each upon such public work. Pursuant to Labor Law §220 the Comptroller of the City of New York has promulgated this schedule solely for Workers, Laborers and Mechanics engaged by private contractors on New York City public work contracts.

Contracting agencies anticipating doing work which requires the employment of a trade or classification not included in this schedule must request the Comptroller to establish a proper classification for the work pursuant to Labor Law §220 (3-a) (a). The prevailing rate schedule as promulgated by the Comptroller, must, in compliance with law, be annexed to and form part of the contract.

Contractors are solely responsible for maintaining original payroll records which delineate, among other things, the hours each employee worked within a given classification. Contractors using rates and/or classifications not promulgated by the Comptroller do so at their own risk. Additionally, prior to bid, Agency Chief Contracting Officers must contact the Bureau of Labor Law when the need arises for a work classification not published in this schedule.

The appropriate schedule of prevailing wages and benefits must be posted at all public work sites pursuant to Labor Law §220 (3-a) (a).

This schedule is applicable for work performed during the effective period, unless otherwise noted. You will be notified of any changes to this schedule by addenda published on our web site at [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov). The rate of wages and supplemental benefits to be paid or provided are those that prevail at the time the work is being performed. Preliminary schedules for future one-year periods are published annually in the City Record on or about June 1<sup>st</sup> of each succeeding year. Final schedules are published on or about July 1<sup>st</sup> in the City Record and on our web site at [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov).

The Comptroller's Office has attempted to include all overtime, shift and night differential, Holiday, Saturday, Sunday or other premium time work. However, this schedule does not set forth every prevailing practice with respect to such rates with which employers must comply. All such practices are nevertheless part of the employer's prevailing wage obligation and contained in the collective bargaining agreements of the prevailing wage unions. These collective bargaining agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classification Unit by calling (212) 669-7974. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasyl Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

Prevailing rates and ratios for apprentices are attached to this schedule in the Appendix. Pursuant to Labor Law §220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant, registered with the New York State Department of Labor, may be employed on a public work project. Workers who are not journey persons or not registered apprentices pursuant to Labor Law §220 (3-e) may not be substituted for apprentices and must be paid as journey persons.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Contractors are advised to review the applicable Collective Bargaining Agreements and the Comptroller's Prevailing Wage Schedule before bidding on Public Work. If there are any questions concerning prevailing wages, benefits, overtime, Holiday pay, shift differentials or any prevailing practice, please contact this office.

Public Work construction, reconstruction, demolition, excavation, rehabilitation, repair, renovation, alteration, or improvement contracts awarded pursuant to a Project Labor Agreement ("PLA") in accordance with Labor Law section 222 may have different labor standards for shift, premium and overtime work. Please refer to the PLA's pre-negotiated labor agreements for wage and benefit rates applicable to work performed outside of the regular workday. More information is available at the Mayor's Office of Contract Services (MOCS) web page at <http://www.nyc.gov/html/mocs/html/vendors/pla.shtml>.

All the provisions of Labor Law section 220 remain applicable to PLA work including, but not limited to, the enforcement of prevailing wage requirements by the Comptroller; however, we will enforce shift, premium, overtime and other non-standard rates as they appear in a project's pre-negotiated labor agreement.

Any error as to compensation under the prevailing wage law or other information as to trade classification, made by the contracting agency in the contract documents or in any other communication, will not preclude a finding against the contractor of prevailing wage violation.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

- 1) Provide bona-fide benefits which cost the employer no less than the prevailing supplemental benefits rate; or
- 2) Supplement the employee's hourly wage by an amount no less than the prevailing supplemental benefits rate; or
- 3) Provide a combination of bona-fide benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.

Particular attention should be given to the supplemental benefits requirement. Although in most instances the payment or provision for supplemental benefits is for each hour worked, some classifications require the payment or provision of supplemental benefits for each hour paid. Consequently, some prevailing practices require benefits to be purchased at the overtime, shift differential, Holiday, Saturday, Sunday or other premium time rate.

Benefits are paid for **EACH HOUR WORKED** unless otherwise noted.

Wasył Kinach, P.E.  
Director of Classifications  
Bureau of Labor Law

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**ASBESTOS HANDLER**

(Hazardous Material; Disturbs, removes, encapsulates, repairs, or encloses friable asbestos material)

Asbestos Handler

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.90

Supplemental Benefit Rate per Hour: \$15.05

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Sunday.

Time and one half the regular hourly rate after 40 hours in any work week.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

Easter

**Paid Holidays**

None

(Local #78 and Local #12A)

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**BLASTER**

Blaster

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$44.40

Supplemental Benefit Rate per Hour: \$38.44

Blaster (Hydraulic)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.17

Supplemental Benefit Rate per Hour: \$38.44

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

**Blaster - Trac Drill Hydraulic**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$40.04  
Supplemental Benefit Rate per Hour: \$38.44

**Blaster - Wagon: Air Trac: Quarry Bar: Drillrunners**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$39.30  
Supplemental Benefit Rate per Hour: \$38.44

**Blaster - Operators of Jack Hammers**

Chippers: Spaders: Concrete Breakers: and all other pneumatic tools of like usage: Walk Behind Self Propelled Hydraulic Asphalt and Concrete Breakers: Hydro (Water) Demolition

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$38.32  
Supplemental Benefit Rate per Hour: \$38.44

**Blaster - Powder Carriers**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$34.66  
Supplemental Benefit Rate per Hour: \$38.44

**Blaster - Hydraulic Trac Drill Chuck Tender**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$33.46  
Supplemental Benefit Rate per Hour: \$38.44

**Blaster - Chuck Tender & Nipper**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$32.75  
Supplemental Benefit Rate per Hour: \$38.44

**Blaster - Magazine Keepers: (Watch Person)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$19.76  
Supplemental Benefit Rate per Hour: \$38.44

**Overtime Description**

Magazine Keepers:  
Time and one half for work performed in excess of forty (40) hours per week and for work performed on Saturdays, Sundays and Holidays.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

All Other Employees:

Time and one-half for the first eight hours of work on Saturday and for Make-up Time. Double time for all hours over eight Monday through Friday (except make-up hours) and for all hours worked on Sunday and Holidays.

**Overtime**

Double time the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

**Paid Holidays**

None

**Shift Rates**

A single shift shall be 8 hours plus an unpaid lunch, starting at 8:00 A.M (or between 6:00 A.M. and 10:00 A.M. on weekdays). When two (2) shifts are employed, each shift shall be 8 hours plus ½ hour unpaid lunch. When three (3) shifts are employed, each shift will work seven and one-half (7 ½) hours, but will be paid for eight (8) hours, since only one-half (½) hour is allowed for mealtime. When two (2) or more shifts are employed, single time will be paid for each shift. The first 8 hours of any and all work performed Monday through Friday inclusive of any off-shift shall be at the single time rate.

(Local #29)

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**BOILERMAKER**

Boilermaker

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$49.47

Supplemental Benefit Rate per Hour: \$39.78

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$59.08; For double overtime - \$78.37.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$50.45

Supplemental Benefit Rate per Hour: \$41.31

Supplemental Note: The above rate applies to repair or maintenance and new construction; For time and one half overtime - \$61.37; For double overtime - \$81.43.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

### Overtime Description

For Repair and Maintenance work:  
Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.  
For New Construction work:  
Double time the regular rate after an 8 hour day.  
Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Columbus Day  
Election Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

Quadruple time the regular rate for work on the following holiday(s).  
Labor Day

### Paid Holidays

Good Friday  
Day after Thanksgiving  
Day before Christmas  
Day before New Year's Day

### Shift Rates

When shifts are required, the first shift shall work eight (8) hours at the regular straight-time hourly rate. The second shift shall work seven and one-half (7 ½) hours and receive eight hours at the regular straight time hourly rate plus twenty-five cents (\$0.25) per hour. The third shift shall work seven (7) hours and receive eight hours at the regular straight time hourly rate plus fifty cents (\$0.50) per hour. A thirty (30) minute lunch period shall not be considered as time worked. Work in excess of the above shall be paid overtime at the appropriate new construction work or repair work overtime wage and supplemental benefit hourly rate.

(Local #5)

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## BRICKLAYER

### Bricklayer

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$46.44

Supplemental Benefit Rate per Hour: \$27.53

### Overtime

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Time and one half the regular rate after a 7 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.  
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

### Paid Holidays

None

### Shift Rates

Overtime rates to be paid outside the regular scheduled work day.

(Bricklayer District Council)

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## CARPENTER - BUILDING COMMERCIAL

### Building Commercial

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$48.08

Supplemental Benefit Rate per Hour: \$41.10

### Overtime

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.  
Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
Washington's Birthday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

### **Paid Holidays**

None

### **Shift Rates**

The second shift will receive one hour at the double time rate of pay for the last hour of the shift; eight hours pay for seven hours of work, nine hours pay for eight hours of work. There must be a first shift in order to work a second shift.

(Carpenters District Council)

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## **CARPENTER - HEAVY CONSTRUCTION WORK (Construction of Engineering Structures and Building Foundations)**

### **Heavy Construction Work**

Effective Period: 7/1/2013 - 7/17/2013

Wage Rate per Hour: \$46.74

Supplemental Benefit Rate per Hour: \$42.37

Effective Period: 7/18/2013 - 6/30/2014

Wage Rate per Hour: \$46.82

Supplemental Benefit Rate per Hour: \$44.97

### **Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### **Paid Holidays**

None

### **Shift Rates**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Carpenters District Council)

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## CEMENT & CONCRETE WORKER

### Cement & Concrete Worker

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.33

Supplemental Benefit Rate per Hour: \$26.17

Supplemental Note: \$28.92 on Saturdays; \$31.67 on Sundays & Holidays

### Overtime Description

Time and one half the regular rate after 7 hour day (time and one half the regular rate after an 8 hour day when working with Dockbuilders on pile cap forms and for work below street level to the top of the foundation wall, not to exceed 2 feet or 3 feet above the sidewalk-brick shelf, when working on the foundation and structure.)

### Overtime

Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

1/2 day before Christmas Day

1/2 day before New Year's Day

### Shift Rates

On shift work extending over a twenty-four hour period, all shifts are paid at straight time.

(Cement Concrete Workers District Council)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

## CEMENT MASON

### Cement Mason

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.63

Supplemental Benefit Rate per Hour: \$39.05

Supplemental Note: Overtime supplemental benefit rate per hour: \$57.55

### Overtime Description

Time and one-half the regular rate after an 8 hour day, double time the regular rate after 10 hours. Time and one-half the regular rate on Saturday, double time the regular rate after 10 hours. Double time the regular rate on Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

### Shift Rates

For an off shift day, (work at times other than the regular 7:00 A.M. to 3:30 P.M. work day) a cement mason shall be paid at the regular hourly rate plus a 25% per hour differential. Four Days a week at Ten (10)hour day.

(Local #780)

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## CORE DRILLER

### Core Driller

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.44

Supplemental Benefit Rate per Hour: \$19.75

### Core Driller Helper

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$28.60  
Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper(Third year in the industry)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$25.74  
Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper (Second year in the industry)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$22.88  
Supplemental Benefit Rate per Hour: \$19.75

Core Driller Helper (First year in the industry)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$20.02  
Supplemental Benefit Rate per Hour: \$19.75

**Overtime Description**

Time and one half the regular rate for work on a holiday plus Holiday pay when worked.

**Overtime**

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.  
Time and one half the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

**Shift Rates**

The shift day shall be the continuous eight and one-half (8½) hours from 6:00 A.M. to 2:30 P.M. and from 2:30 P.M. to 11:00 P.M., including one-half (½) hour of employees regular rate of pay for lunch. When two (2) or more shifts are employed, single time shall be paid for each shift, but those employees employed on a shift other than from 8:00 A.M. to 5:00 P.M. shall, in addition, receive seventy-five cents (\$0.75) per hour differential for each hour worked. When three (3) shifts are needed, each shift shall work seven and one-half (7 ½) hours paid for eight (8) hours of labor and be permitted one-half (½) hour for mealtime.

(Carpenters District Council)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

**DERRICKPERSON AND RIGGER**

Derrick Person & Rigger

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$41.00

Supplemental Benefit Rate per Hour: \$46.07

Supplemental Note: The above supplemental rate applies for work performed in Manhattan, Bronx, Brooklyn and Queens. \$47.49 - For work performed in Staten Island.

Derrick Person & Rigger - Site Work

For site work where no rigging is involved.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$30.00

Supplemental Benefit Rate per Hour: \$31.32

**Overtime Description**

The first two hours of overtime on weekdays and the first seven hours of work on Saturdays are paid at time and one half for wages and supplemental benefits. All additional overtimes is paid at double time for wages and supplemental benefits. Deduct \$1.42 from the Staten Island hourly benefits rate before computing overtime.

**Overtime**

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Good Friday

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

1/2 day on Christmas Eve if work is performed in the A.M.

(Local #197)

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**DIVER**

Diver (Marine)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$59.40

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$44.97

Diver Tender (Marine)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.05

Supplemental Benefit Rate per Hour: \$44.97

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

**Shift Rates**

When three shifts are utilized each shift shall work seven and one half-hours (7 1/2 hours) and paid for 8 hours, allowing for one half hour for lunch.

(Carpenters District Council)

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**DOCKBUILDER - PILE DRIVER**

Dockbuilder - Pile Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$46.82

Supplemental Benefit Rate per Hour: \$44.97

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

### Paid Holidays

None

### Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Carpenters District Council)

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## DRIVER: TRUCK (TEAMSTER)

### Driver - Automobile Chauffeur (Dump Truck)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.11

Supplemental Benefit Rate per Hour: \$40.20

### Driver - Heavy Equipment Trailer Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.61

Supplemental Benefit Rate per Hour: \$40.20

Note: For time and one half overtime Wage Rate - \$57.16; for double time overtime Wage Rate - \$76.21

### Driver - Euclid & Turnapull Operator

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.67

Supplemental Benefit Rate per Hour: \$40.20

### Driver - Six Wheeler(3 Axle) Tractors & Trailers

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$39.11

Supplemental Benefit Rate per Hour: \$40.20

Note: For time and one half overtime Wage Rate - \$58.01; for double time overtime Wage Rate - \$77.34

Driver - Boom Truck

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.36

Supplemental Benefit Rate per Hour: \$40.20

Note: For time and one half overtime Wage Rate - \$58.01; for double time overtime Wage Rate - \$77.34

**Overtime Description**

For Paid Holidays: Holiday pay for all holidays shall be prorated based two hours per day for each day worked in the holiday week, not to exceed 8 hours of holiday pay. For Thanksgiving week, the prorated share shall be 5 1/3 hours of holiday pay for each day worked in Thanksgiving week.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Paid Holidays**

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

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Driver - Redi-Mix Driver (Sand & Gravel)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.71

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$37.27

### Overtime Description

For Paid Holidays: Employees working two (2) days in the calendar week in which the holiday falls are to be paid for these holidays, provided they shape each remaining workday during that calendar week.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

President's Day

Columbus Day

Veteran's Day

Triple time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

Christmas Day

(Local #282)

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## ELECTRICIAN

(Including all low voltage cabling carrying data; video; and voice in combination with data and or video.)

### Electrician "A" (Regular Day)

Effective Period: 7/1/2013 - 5/13/2014

Wage Rate per Hour: \$52.00

Supplemental Benefit Rate per Hour: \$46.13

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$53.00  
Supplemental Benefit Rate per Hour: \$47.54

Electrician "A" (Regular Day Overtime)

Effective Period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$78.00  
Supplemental Benefit Rate per Hour: \$49.39

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$79.50  
Supplemental Benefit Rate per Hour: \$50.86

Electrician "A" (Day Shift)

Effective Period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$52.00  
Supplemental Benefit Rate per Hour: \$46.13

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$53.00  
Supplemental Benefit Rate per Hour: \$47.54

Electrician "A" (Day Shift Overtime After 8 hours)

Effective Period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$78.00  
Supplemental Benefit Rate per Hour: \$49.39

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$79.50  
Supplemental Benefit Rate per Hour: \$50.86

Electrician "A" (Swing Shift)

Effective Period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$61.01  
Supplemental Benefit Rate per Hour: \$52.47

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$62.19  
Supplemental Benefit Rate per Hour: \$54.07

Electrician "A" (Swing Shift Overtime After 7.5 hours)

Effective Period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$91.52  
Supplemental Benefit Rate per Hour: \$56.30

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$93.29  
Supplemental Benefit Rate per Hour: \$57.97

**Electrician "A" (Graveyard Shift)**

Effective Period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$68.34  
Supplemental Benefit Rate per Hour: \$57.83

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$69.66  
Supplemental Benefit Rate per Hour: \$59.59

**Electrician "A" (Graveyard Shift Overtime After 7 hours)**

Effective Period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$102.51  
Supplemental Benefit Rate per Hour: \$62.11

Effective Period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$104.49  
Supplemental Benefit Rate per Hour: \$63.96

**Overtime**

Time and one half the regular rate after a 7 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on a holiday.  
New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

**Shift Rates**

When so elected by the Employer, one or more shifts of at least five days duration may be scheduled as follows:  
Day Shift: 8:00 am to 4:30 pm, Swing Shift 4:30 pm to 12:30 am, Graveyard Shift: 12:30 am to 8:00 am.

For multiple shifts of temporary light and/or power, the temporary light and/or power employee shall be paid for 8 hours at the straight time rate.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

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**Electrician "M" (First 8 hours)**

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2013 - 5/13/2014

Wage Rate per Hour: \$26.50

Supplemental Benefit Rate per Hour: \$19.56

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: \$25.80

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: \$19.21

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: \$22.00

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: \$17.30

Effective Period: 5/14/2014 - 6/30/2014

Wage Rate per Hour: \$27.00

Supplemental Benefit Rate per Hour: \$20.32

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: \$26.30

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: \$19.96

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: \$22.50

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: \$18.06

**Electrician "M" (Overtime After First 8 hours)**

"M" rated work shall be defined as jobbing: electrical work of limited duration and scope, also consisting of repairs and/or replacement of electrical and tele-data equipment. Includes all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls and washing and cleaning of foregoing fixtures.

Effective Period: 7/1/2013 - 5/13/2014

Wage Rate per Hour: \$39.75

Supplemental Benefit Rate per Hour: \$21.23

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: \$38.70

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: \$20.83

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: \$33.00

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: \$18.68

Effective Period: 5/14/2014 - 6/30/2014

Wage Rate per Hour: \$40.50

Supplemental Benefit Rate per Hour: \$21.01

First and Second Year "M" Wage Rate Per Hour - Hired on or before 5/10/07: \$39.45

First and Second Year "M" Supplemental Rate- Hired on or before 5/10/07: \$21.61

First and Second Year "M" Wage Rate Per Hour - Hired after 5/10/07: \$33.75

First and Second Year "M" Supplemental Rate- Hired after 5/10/07: \$19.47

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Time and one half the regular rate for Sunday.

### Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Paid Holidays

None

(Local #3)

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## ELECTRICIAN - ALARM TECHNICIAN

(Scope of Work - Inspect, test, repair, and replace defective, malfunctioning, or broken devices, components and controls of Fire, Burglar and Security Systems)

### Alarm Technician

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$30.40

Supplemental Benefit Rate per Hour: \$13.90

Supplemental Note: \$12.40 only after 8 hours worked in a day

### Overtime Description

Time and one half the regular rate for work on the following holidays: Columbus Day, Veterans Day, Day after Thanksgiving.

Double time the regular rate for work on the following holidays: New Year's day, Martin Luther King Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Paid Holidays

New Year's Day  
Martin Luther King Jr. Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Shift Rates**

Night Differential is based upon a ten percent (10%) differential between the hours of 4:00 P.M. and 12:30 A.M. and a fifteen percent (15%) differential for the hours 12:00 A.M. to 8:00 A.M.

**Vacation**

At least 1 year of employment.....ten (10) days  
5 years or more of employment.....fifteen (15) days  
10 years of employment.....twenty (20) days  
Plus one Personal Day per year

Sick Days:  
One day per Year

(Local #3)

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**ELECTRICIAN-STREET LIGHTING WORKER**

**Electrician - Electro Pole Electrician**

Effective Period: 7/1/2013 - 5/20/2014  
Wage Rate per Hour: \$52.00  
Supplemental Benefit Rate per Hour: \$47.90

Effective Period: 5/21/2014 - 6/30/2014  
Wage Rate per Hour: \$53.00  
Supplemental Benefit Rate per Hour: \$49.34

**Electrician - Electro Pole Foundation Installer**

Effective Period: 7/1/2013 - 5/20/2014  
Wage Rate per Hour: \$39.42  
Supplemental Benefit Rate per Hour: \$36.46

Effective Period: 5/21/2014 - 6/30/2014  
Wage Rate per Hour: \$40.18  
Supplemental Benefit Rate per Hour: \$37.73

**Electrician - Electro Pole Maintainer**

Effective Period: 7/1/2013 - 5/20/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$33.75  
Supplemental Benefit Rate per Hour: \$32.83

Effective Period: 5/21/2014 - 6/30/2014  
Wage Rate per Hour: \$34.40  
Supplemental Benefit Rate per Hour: \$34.00

### Overtime Description

Electrician - Electro Pole Electrician: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week.

Electrician - Electro Pole Foundation Installer: Time and one half the regular rate after 8 hours within a 24 hour period and Saturday and Sunday.

Electrician - Electro Pole Maintainer: Time and one half the regular rate after a 7 hour day and after 5 consecutive days worked per week. Saturdays and Sundays may be used as a make-up day at straight time when a day is lost during the week to inclement weather.

### Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Paid Holidays

None

(Local #3)

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## ELEVATOR CONSTRUCTOR

### Elevator Constructor

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$57.01  
Supplemental Benefit Rate per Hour: \$34.48

### Overtime Description

For New Construction: work performed after 7 or 8 hour day, Saturday, Sunday or between 4:30pm and 7:00am shall be paid at double time rate.

Existing buildings: work performed after an 8 hour day, Saturday, Sunday or between 5:30pm and 7:00 am shall be paid time and one half.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Overtime**

Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Vacation**

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

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**ELEVATOR REPAIR & MAINTENANCE**

**Elevator Service/Modernization Mechanic**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.14

Supplemental Benefit Rate per Hour: \$33.02

**Overtime Description**

For Service Work: Double time - all work performed on Sundays, Holidays, and between midnight and 7:00am.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

**Paid Holidays**

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Shift Rates

For Modernization Work (4pm to 12:30am) - regularly hourly rate plus a (15%) fifteen percent differential.

### Vacation

Employer contributes 8% of regular basic hourly rate as vacation pay for employees with more than 15 years of service, and 6% for employees with 5 to 15 years of service, and 4% for employees with less than 5 years of service.

(Local #1)

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## ENGINEER

### Engineer - Heavy Construction Operating Engineer I

Cherry pickers 20 tons and over and Loaders (rubber tired and/or tractor type with a manufacturer's minimum rated capacity of six cubic yards and over).

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$61.05

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$97.68

### Engineer - Heavy Construction Operating Engineer II

Backhoes, Basin Machines, Groover, Mechanical Sweepers, Bobcat, Boom Truck, Barrier Transport (Barrier Mover) & machines of similar nature. Operation of Churn Drills and machines of a similar nature, Stetco Silent Hoist and machines of similar nature, Vac-Alls, Meyers Machines, John Beam and machines of a similar nature, Ross Carriers and Travel Lifts and machines of a similar nature, Bulldozers, Scrapers and Turn-a-Pulls: Tugger Hoists (Used exclusively for handling excavated material); Tractors with attachments, Hyster and Roustabout Cranes, Cherry pickers. Austin Western, Grove and machines of a similar nature, Scoopmobiles, Monorails, Conveyors, Trenchers: Loaders-Rubber Tired and Tractor: Barber Greene and Eimco Loaders and Eimco Backhoes; Mighty Midget and similar breakers and Tampers, Curb and Gutter Pavers and Motor Patrol, Motor Graders and all machines of a similar nature. Locomotives 10 Tons or under. Mini-Max, Break-Tech and machines of a similar nature; Milling machines, robotic and demolition machines and machines of a similar nature, shot blaster, skid steer machines and machines of a similar nature including bobcat, pile rig rubber-tired excavator (37,000 lbs. and under), 2 man auger.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$59.24

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$94.78

### Engineer - Heavy Construction Operating Engineer III

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Minor Equipment such as Tractors, Post Hole Diggers, Ditch Witch (Walk Behind), Road Finishing Machines, Rollers five tons and under, Tugger Hoists, Dual Purpose Trucks, Fork Lifts, and Dempsey Dumpers, Fireperson.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$56.22

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$89.95

**Engineer - Heavy Construction Maintenance Engineer I**

Installing, Repairing, Maintaining, Dismantling and Manning of all equipment including Steel Cutting, Bending and Heat Sealing Machines, Mechanical Heaters, Grout Pumps, Bentonite Pumps & Plants, Screening Machines, Fusion Coupling Machines, Tunnel Boring Machines Moles and Machines of a similar nature, Power Packs, Mechanical Hydraulic Jacks; all drill rigs including but not limited to Churn, Rotary Caisson, Raised Bore & Drills of a similar nature; Personnel, Inspection & Safety Boats or any boats used to perform functions of same, Mine Hoists, Whirlies, all Climbing Cranes, all Tower Cranes, including but not limited to Truck Mounted and Crawler Type and machines of similar nature; Maintaining Hydraulic Drills and machines of a similar nature; Well Point System-Installation and dismantling; Burning, Welding, all Pumps regardless of size and/or motor power, except River Cofferdam Pumps and Wells Point Pumps; Motorized Buggies (three or more); equipment used in the cleaning and televising of sewers, but not limited to jet-rodder/vacuum truck, vacall/vactor, closed circuit television inspection equipment; high powered water pumps, jet pumps; screed machines and concrete finishing machines of a similar nature; vermeers.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$58.97

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$94.35

**Engineer - Heavy Construction Maintenance Engineer II**

On Base Mounted Tower Cranes

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$77.30

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$123.68

**Engineer - Heavy Construction Maintenance Engineer III**

On Generators, Light Towers

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.10

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$62.56

**Engineer - Heavy Construction Maintenance Engineer IV**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 PREVAILING WAGE SCHEDULE

On Pumps and Mixers including mud sucking

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$40.11

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$64.18

Engineer - Heavy Construction Oilers I

Gradalls, Cold Planer Grader, Concrete Pumps, Driving Truck Cranes, Driving and Operating Fuel and Grease Trucks.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$53.22

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$85.15

Engineer - Heavy Construction Oilers II

All gasoline, electric, diesel or air operated Shovels, Draglines, Backhoes, Keystones, Pavers, Gunite Machines, Battery of Compressors, Crawler Cranes, two-person Trenching Machines.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$36.97

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$59.15

Engineer - Steel Erection Maintenance Engineers

Derrick, Travelers, Tower, Crawler Tower and Climbing Cranes

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$57.05

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$91.28

Engineer - Steel Erection Oiler I

On a Truck Crane

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$53.43

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$85.49

Engineer - Steel Erection Oiler II

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

On a Crawler Crane

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$40.84

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

Shift Wage Rate: \$65.34

### Overtime Description

On jobs of more than one shift, if the next shift employee fails to report for work through any cause over which the employer has no control, the employee on duty who works the next shift continues to work at the single time rate.

### Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

### Paid Holidays

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

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## Engineer - Building Work Maintenance Engineers I

Installing, repairing, maintaining, dismantling (of all equipment including: Steel Cutting and Bending Machines, Mechanical Heaters, Mine Hoists, Climbing Cranes, Tower Cranes, Linden Peine, Lorain, Liebherr, Mannes, or machines of a similar nature, Well Point Systems, Deep Well Pumps, Concrete Mixers with loading Device, Concrete Plants, Motor Generators when used for temporary power and lights), skid steer machines of a similar nature including bobcat.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$54.04

Supplemental Benefit Rate per Hour: \$31.93

Supplemental Note: \$57.46 on overtime

## Engineer - Building Work Maintenance Engineers II

On Pumps, Generators, Mixers and Heaters

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$42.10  
Supplemental Benefit Rate per Hour: \$31.93  
Supplemental Note: \$57.46 on overtime

**Engineer - Building Work Oilers I**

All gasoline, electric, diesel or air operated Gradealls: Concrete Pumps, Overhead Cranes in Power Houses: Their duties shall be to assist the Engineer in oiling, greasing and repairing of all machines; Driving Truck Cranes: Driving and Operating Fuel and Grease Trucks, Cherrypickers (hydraulic cranes) over 70,000 GVW, and machines of a similar nature.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$51.40  
Supplemental Benefit Rate per Hour: \$31.93  
Supplemental Note: \$57.46 on overtime

**Engineer - Building Work Oilers II**

Oilers on Crawler Cranes, Backhoes, Trenching Machines, Gunite Machines, Compressors (three or more in Battery).

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$38.31  
Supplemental Benefit Rate per Hour: \$31.93  
Supplemental Note: \$57.46 on overtime

**Overtime Description**

On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

**Overtime**

Double time the regular rate after an 8 hour day.  
Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.  
Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day  
Lincoln's Birthday  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

**Shift Rates**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Off Shift: double time the regular hourly rate.

(Local #15)

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**ENGINEER - CITY SURVEYOR AND CONSULTANT**

**Party Chief**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.55

Supplemental Benefit Rate per Hour: \$17.65

**Instrument Person**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$29.41

Supplemental Benefit Rate per Hour: \$17.65

**Rodperson**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$25.54

Supplemental Benefit Rate per Hour: \$17.65

**Overtime Description**

Overtime Benefit Rate - \$23.63 per hour (time & one half) \$29.95 per hour (double time).

Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

**Paid Holidays**

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**ENGINEER - FIELD (BUILDING CONSTRUCTION)**  
(Construction of Building Projects, Concrete Superstructures, etc.)

Field Engineer - BC Party Chief

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$55.40

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime Benefit Rate - \$42.73 per hour (time & one half) \$54.84 per hour (double time).

Field Engineer - BC Instrument Person

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$43.10

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime Benefit Rate - \$42.73 per hour (time & one half) \$54.84 per hour (double time).

Field Engineer - BC Rodperson

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$27.96

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime Benefit Rate - \$42.73 per hour (time & one half) \$54.84 per hour (double time).

**Overtime Description**

Time and one half the regular rate after a 7 hour work and time and one half the regular rate for Saturday for the first seven hours worked, Double time the regular time rate for Saturday for work performed in excess of seven hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

**Paid Holidays**

New Year's Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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**ENGINEER - FIELD (HEAVY CONSTRUCTION)**  
(Construction of Roads, Tunnels, Bridges, Sewers, Building Foundations,  
Engineering Structures etc.)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Field Engineer - HC Party Chief

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$62.61

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

Field Engineer - HC Instrument Person

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$46.00

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

Field Engineer - HC Rodperson

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.61

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

**Overtime Description**

Time and one half the regular rate after an 8 hour day, Time and one half the regular rate for Saturday for the first eight hours worked, Double time the regular time rate for Saturday for work performed in excess of eight hours, Double time the regular rate for Sunday and Double time the regular rate for work on a holiday.

**Paid Holidays**

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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**ENGINEER - FIELD (STEEL ERECTION)**

Field Engineer - Steel Erection Party Chief

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$58.50

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

**Field Engineer - Steel Erection Instrument Person**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.53

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

**Field Engineer - Steel Erection Rodperson**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$30.43

Supplemental Benefit Rate per Hour: \$30.62

Supplemental Note: Overtime benefit rate - \$42.73 per hour (time & one half), \$54.84 per hour (double time).

**Overtime Description**

Time and one half the regular rate for Saturday for the first eight hours worked.

Double time the regular rate for Saturday for work performed in excess of eight hours.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

(Operating Engineer Local #15-D)

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**ENGINEER - OPERATING**

**Operating Engineer - Road & Heavy Construction I**

Back Filling Machines, Cranes, Mucking Machines and Dual Drum Paver.

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$67.70  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$108.32

Operating Engineer - Road & Heavy Construction II

Backhoes, Power Shovels, Hydraulic Clam Shells, Steel Erection, Moles and machines of a similar nature.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$70.10  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: 51.75 overtime hours  
Shift Wage Rate: \$112.16

Operating Engineer - Road & Heavy Construction III

Mine Hoists, Cranes, etc. (Used as Mine Hoists)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$72.34  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$115.74

Operating Engineer - Road & Heavy Construction IV

Gradealls, Keystones, Cranes on land or water (with digging buckets), Bridge Cranes, Vermeer Cutter and machines of a similar nature, Trenching Machines.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$70.63  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$113.01

Operating Engineer - Road & Heavy Construction V

Pile Drivers & Rigs (employing Dock Builder foreperson): Derrick Boats, Tunnel Shovels.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$69.23  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$110.77

Operating Engineer - Road & Heavy Construction VI

Mixers (Concrete with loading attachment), Concrete Pavers, Cableways, Land Derricks, Power Houses (Low Air Pressure Units).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$65.76  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$105.22

Operating Engineer - Road & Heavy Construction VII

Barrier Movers , Barrier Transport and Machines of a Similar Nature.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$53.08  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$84.93

Operating Engineer - Road & Heavy Construction VIII

Utility Compressors

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$41.18  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$51.93

Operating Engineer - Road & Heavy Construction IX

Horizontal Boring Rig

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$62.53  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$100.05

Operating Engineer - Road & Heavy Construction X

Elevators (manually operated as personnel hoist).

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$57.46  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$91.94

Operating Engineer - Road & Heavy Construction XI

Compressors (Portable 3 or more in battery), Driving of Truck Mounted Compressors, Well-point Pumps, Tugger Machines Well Point Pumps, Churn Drill.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$44.63  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$71.41

Operating Engineer - Road & Heavy Construction XII

All Drills and Machines of a similar nature.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$66.45  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$106.32

Operating Engineer - Road & Heavy Construction XIII

Concrete Pumps, Concrete Plant, Stone Crushers, Double Drum Hoist, Power Houses (other than above).

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$64.34  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$102.94

Operating Engineer - Road & Heavy Construction XIV

Concrete Mixer

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$61.53  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$98.45

Operating Engineer - Road & Heavy Construction XV

Compressors (Portable Single or two in Battery, not over 100 feet apart), Pumps (River Cofferdam) and Welding Machines, Push Button Machines, All Engines Irrespective of Power (Power-Pac) used to drive auxiliary equipment, Air, Hydraulic, etc.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$41.44  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$66.30

Operating Engineer - Road & Heavy Construction XVI

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Concrete Breaking Machines, Hoists (Single Drum), Load Masters, Locomotives (over ten tons) and Dinkies over ten tons, Hydraulic Crane-Second Engineer.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$58.74  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.85 overtime hours  
Shift Wage Rate: \$93.98

Operating Engineer - Road & Heavy Construction XVII

On-Site concrete plant engineer, On-site Asphalt Plant Engineer, and Vibratory console.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$59.21  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$94.74

Operating Engineer - Road & Heavy Construction XVIII

Tower Crane

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$85.00  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$136.00

Operating Engineer - Paving I

Asphalt Spreaders, Autogrades (C.M.I.), Roto/Mil

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$65.76  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$105.22

Operating Engineer - Paving II

Asphalt Roller

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$64.04  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$102.46

Operating Engineer - Paving III

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Asphalt Plants

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$54.17

Supplemental Benefit Rate per Hour: \$28.60

Supplemental Note: \$51.75 overtime hours

Shift Wage Rate: \$86.67

Operating Engineer - Concrete I

Cranes

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$70.32

Supplemental Benefit Rate per Hour: \$28.60

Supplemental Note: \$51.75 overtime hours

Operating Engineer - Concrete II

Compressors

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$41.76

Supplemental Benefit Rate per Hour: \$28.60

Supplemental Note: \$51.75 overtime hours

Operating Engineer - Concrete III

Micro-traps (Negative Air Machines), Vac-All Remediation System.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$56.16

Supplemental Benefit Rate per Hour: \$28.60

Supplemental Note: \$51.75 overtime hours

Operating Engineer - Steel Erection I

Three Drum Derricks

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$73.37

Supplemental Benefit Rate per Hour: \$28.60

Supplemental Note: \$51.75 overtime hours

Shift Wage Rate: \$117.39

Operating Engineer - Steel Erection II

Cranes, 2 Drum Derricks, Hydraulic Cranes, Fork Lifts and Boom Trucks.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$70.50

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$112.80

Operating Engineer - Steel Erection III

Compressors, Welding Machines.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$41.84  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$66.94

Operating Engineer - Steel Erection IV

Compressors - Not Combined with Welding Machine.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$39.85  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
Shift Wage Rate: \$63.76

Operating Engineer - Building Work I

Forklifts, Plaster (Platform machine), Plaster Bucket, Concrete Pump and all other equipment used for hoisting material.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$57.82  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work II

Compressors, Welding Machines (Cutting Concrete-Tank Work), Paint Spraying, Sandblasting, Pumps (with the exclusion of Concrete Pumps), All Engines irrespective of Power (Power-Pac) used to drive Auxiliary Equipment, Air, Hydraulic, Jacking System, etc.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$43.28  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work III

Double Drum

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$65.83

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work IV

Stone Derrick, Cranes, Hydraulic Cranes Boom Trucks.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$69.74  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work V

Dismantling and Erection of Cranes, Relief Engineer.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$64.26  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work VI

4 Pole Hoist, Single Drum Hoists.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$63.58  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours

Operating Engineer - Building Work VII

Rack & Pinion and House Cars

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$50.53  
Supplemental Benefit Rate per Hour: \$28.60  
Supplemental Note: \$51.75 overtime hours  
For New House Car projects started after 7/1/11 only: Wage Rate per Hour \$40.31

**Overtime Description**

On jobs of more than one shift, if an Employee fails to report for work through any cause over which the Employer has no control, the Employee on duty will continue to work at the rate of single time.

For House Cars and Rack & Pinion only: Overtime paid at time and one-half for all hours in excess of eight hours in a day, Saturday, Sunday and Holidays worked.

**Overtime**

Double time the regular rate after an 8 hour day.  
Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.  
Double time the regular rate for work on the following holiday(s).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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**Paid Holidays**

New Year's Day  
Lincoln's Birthday  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

Employees must work at least one day in the payroll week in which the holiday occurs to receive the paid holiday

**Shift Rates**

For Steel Erection Only: Shifts may be worked at the single time rate at other than the regular working hours (8:00 A.M. to 4:30 P.M.) on the following work ONLY: Heavy construction jobs on work below the street level, over railroad tracks and on building jobs.

(Operating Engineer Local #14)

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**FLOOR COVERER**

(Interior vinyl composition tile, sheath vinyl linoleum and wood parquet tile including site preparation and synthetic turf not including site preparation)

**Floor Coverer**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$46.15

Supplemental Benefit Rate per Hour: \$38.50

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Day after Thanksgiving

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Christmas Day

### **Paid Holidays**

1/2 day on Christmas Eve if work is performed in the A.M.

1/2 day on New Year's Eve if work is performed in the A.M.

### **Shift Rates**

Two shifts may be utilized with the first shift working 8:00 A.M. to the end of the shift at the straight time of pay. The second shift will receive one hour at double time rate for the last hour of the shift. (eight for seven, nine for eight).

(Carpenters District Council)

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## **GLAZIER (New Construction, Remodeling, and Alteration)**

### Glazier

Effective Period: 7/1/2013 - 10/31/2013

Wage Rate per Hour: \$42.00

Supplemental Benefit Rate per Hour: \$33.24

Supplemental Note: Supplemental Benefit Overtime Rate: \$41.24

Effective Period: 11/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.00

Supplemental Benefit Rate per Hour: \$34.09

Supplemental Note: Supplemental Benefit Overtime Rate: \$42.59

### **Overtime Description**

An optional 8th hour can be worked at straight time rate. If 9th hour is worked, then both hours or more (8th & 9th or more) will be at the double time rate of pay.

### **Overtime**

Double time the regular rate after a 7 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Paid Holidays**

None

**Shift Rates**

Shifts shall be any 7 hours beyond 4:00 P.M. for which the glazier shall receive 8 hours pay for 7 hours worked.

(Local #1281)

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**GLAZIER - REPAIR & MAINTENANCE**

(For the Installation of Glass - All repair and maintenance work on a particular building, whenever performed, where the total cumulative contract value is under \$105,000. Except where enumerated (i.e. plate glass windows) does not apply to non-residential buildings.)

**Craft Jurisdiction for repair, maintenance and fabrication**

Plate glass replacement, Residential glass replacement, Residential mirrors and shower doors, Storm windows and storm doors, Residential replacement windows, Herculite door repairs, Door closer repairs, Retrofit apartment house (non commercial buildings), Glass tinting.

Effective Period: 7/1/2013 - 4/30/2014

Wage Rate per Hour: \$23.50

Supplemental Benefit Rate per Hour: \$18.54

Effective Period: 5/1/2014 - 6/30/2014

Wage Rate per Hour: \$23.60

Supplemental Benefit Rate per Hour: \$19.04

**Overtime**

Time and one half the regular rate after an 8 hour day.

Double time the regular rate for Sunday.

Time and one half the regular hourly rate after 40 hours in any work week.

**Paid Holidays**

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

(Local #1281)

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## HEAT AND FROST INSULATOR

### Heat & Frost Insulator

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$56.48

Supplemental Benefit Rate per Hour: \$33.31

### Overtime Description

Double time shall be paid for supplemental benefits during overtime work.

8th hour paid at time and one half.

### Overtime

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Triple time the regular rate for work on the following holiday(s).

Labor Day

### Paid Holidays

None

### Shift Rates

The first shift shall work seven hours at the regular straight time rate. The second and third shift shall work seven hours the regular straight time hourly rate plus a fourteen percent wage and benefit premium.

Off hour work in occupied or retail buildings may be worked on weekdays with an increment of \$1.00 per hour and eight hours pay for seven (7) hours worked. Double time will apply for over seven (7) hours worked on weekdays, weekends or holidays.

(Local #12)

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## HOUSE WRECKER (TOTAL DEMOLITION)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

House Wrecker - Tier A

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$34.01

Supplemental Benefit Rate per Hour: \$25.14

House Wrecker - Tier B

On all work sites the first, second, eleventh and every third House Wrecker thereafter shall be Tier A House Wreckers (i.e. 1st, 2nd, 11th, 14th etc). The 10th and 20th House Wrecker shall be apprentices. Other House Wreckers shall be Tier B House Wreckers.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.75

Supplemental Benefit Rate per Hour: \$18.62

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

(Mason Tenders District Council)

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**IRON WORKER - ORNAMENTAL**

Iron Worker - Ornamental

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.30

Supplemental Benefit Rate per Hour: \$43.54

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

### Overtime Description

Time and one half the regular rate after a 7 hour day for a maximum of two hours on any regular work day (the 8th and 9th hour) and double time shall be paid for all work on a regular work day thereafter, time and one half the regular rate for Saturday for the first seven hours of work and double time shall be paid for all work on a Saturday thereafter.

### Overtime

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

### Paid Holidays

None

### Shift Rates

For off shift work - 8 hours pay for 7 hours of work. When two or three shifts are employed on a job, Monday through Friday, the workday for each shift shall be seven hours and paid for ten and one-half hours at the single time rate. When two or three shifts are worked on Saturday, Sunday or holidays, each shift shall be seven hours and paid fifteen and three-quarters hours.

(Local #580)

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## IRON WORKER - STRUCTURAL

### Iron Worker - Structural

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$46.75

Supplemental Benefit Rate per Hour: \$62.48

Supplemental Note: Supplemental benefits are to be paid at the applicable overtime rate when overtime is in effect.

### Overtime Description

Monday through Friday- the first eight hours are paid at straight time, the 9th and 10th hours are paid at time and one-half the regular rate, all additional weekday overtime is paid at double the regular rate. Saturdays- the first eight hours are paid at time and one-half the regular rate, double time thereafter. Sunday-all shifts are paid at double time.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

### Overtime

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).  
New Year's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

### Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.  
1/2 day on New Year's Eve if work is performed in the A.M.

### Shift Rates

Monday through Friday - First Shift: First eight hours are paid at straight time, the 9th & 10th hours are paid at time and a half, double time paid thereafter. Second and third Shifts: First eight hours are paid at time and one-half, double time thereafter. Saturdays: All shifts, first eight hours paid at time and one-half, double time thereafter. Sunday all shifts are paid at double time.

(Local #40 & #361)

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## LABORER

(Foundation, Concrete, Excavating, Street Pipe Layer and Common)

### Laborer

Excavation and foundation work for buildings, heavy construction, engineering work, and hazardous waste removal in connection with the above work. Landscaping tasks in connection with heavy construction work, engineering work and building projects. Projects include, but are not limited to pollution plants, sewers, parks, subways, bridges, highways, etc.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.25

Supplemental Benefit Rate per Hour: \$33.25

### Overtime

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

### **Paid Holidays**

Labor Day  
Thanksgiving Day

### **Shift Rates**

When two shifts are employed, single time rate shall be paid for each shift. When three shifts are found necessary, each shift shall work seven and one half hours (7 ½), but shall be paid for eight (8) hours of labor, and be permitted one half hour for lunch.

(Local #731)

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## **LANDSCAPING**

(Landscaping tasks, as well as tree pruning, tree removing, spraying and maintenance in connection with the planting of street trees and the planting of trees in city parks but not when such activities are performed as part of, or in connection with, other construction or reconstruction projects.)

### **Landscaper (Above 6 years experience)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$24.25  
Supplemental Benefit Rate per Hour: \$12.30

### **Landscaper (3 - 6 years experience)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$23.25  
Supplemental Benefit Rate per Hour: \$12.30

### **Landscaper (up to 3 years experience)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$20.75  
Supplemental Benefit Rate per Hour: \$12.30

### **Groundperson**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$20.75  
Supplemental Benefit Rate per Hour: \$12.30

Tree Remover / Pruner

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$29.25  
Supplemental Benefit Rate per Hour: \$12.30

Landscaper Sprayer (Pesticide Applicator)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$19.25  
Supplemental Benefit Rate per Hour: \$12.30

Watering - Plant Maintainer

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$14.25  
Supplemental Benefit Rate per Hour: \$12.30

**Overtime Description**

For all overtime work performed, supplemental benefits shall include an additional seventy-five (\$0.75) cents per hour.

**Overtime**

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.  
Time and one half the regular rate for work on a holiday plus the day's pay.

**Paid Holidays**

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day

**Shift Rates**

Work performed on a 4pm to 12am shift has a 15% differential. Work performed on a 12am to 8am shift has a 20% differential.

(Local #175)

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**MARBLE MECHANIC**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Marble Setter**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$49.19  
Supplemental Benefit Rate per Hour: \$32.24

**Marble Finisher**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$39.05  
Supplemental Benefit Rate per Hour: \$31.43

**Marble Polisher**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$34.73  
Supplemental Benefit Rate per Hour: \$24.60

**Overtime Description**

Supplemental Benefit contributions are to be made at the applicable overtime rates. Time and one half the regular rate after a 7 hour day or time and one half the regular rate after an 8 hour day - chosen by Employer at the start of the project and then would last for the full duration of the project.

**Overtime**

Time and one half the regular rate for Saturday.  
Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

(Local #7)

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**MASON TENDER**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Mason Tender**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.00

Supplemental Benefit Rate per Hour: \$25.74

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

**Shift Rates**

The Employer may work two (2) shifts with the first shift at the straight time wage rate and the second shift receiving eight (8) hours paid for seven (7) hours work at the straight time wage rate.

(Local #79)

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**MASON TENDER (INTERIOR DEMOLITION WORKER)**

(The erection, building, moving, servicing and dismantling of enclosures, scaffolding, barricades, protection and site safety structures etc., on Interior Demolition jobs.)

**Mason Tender Tier A**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$34.07

Supplemental Benefit Rate per Hour: \$19.77

**Mason Tender Tier B**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

On Interior Demolition job sites 33 1/3 % of the employees shall be classified as Tier A Interior Demolition Workers and 66 2/3 % shall be classified as Tier B Interior Demolition Workers; provided that the employer may employ more than 33 1/3 % Tier A Interior Demolition Workers on the job site. Where the number of employees on a job site is not divisible by 3, the first additional employee (above the number of employees divisible by three) shall be a Tier B Interior Demolition Worker, and the second additional employee shall be a Tier A Interior Demolition Worker.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.27

Supplemental Benefit Rate per Hour: \$14.08

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

(Local #79)

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## METALLIC LATHER

### Metallic Lather

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$41.43

Supplemental Benefit Rate per Hour: \$40.15

Supplemental Note: Supplemental benefits for overtime are paid at the appropriate overtime rate.

### Overtime Description

Overtime would be time and one half the regular rate after a seven (7) or eight (8) hours workday, which would be set at the start of the job.

### Overtime

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

New Year's Day  
Washington's Birthday  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

### **Paid Holidays**

1/2 day on Christmas Eve if work is performed in the A.M.  
1/2 day on New Year's Eve if work is performed in the A.M.

### **Shift Rates**

There shall be either two (2) or three (3) shifts, each shift shall be eight (8) hours with nine (9) hours pay, including one half (½) hour for lunch. Off-Hour Start shall commence after 3:30 P.M. and shall conclude by 6:00 A.M. The first consecutive seven (7) hours shall be at straight time with a differential of twelve dollars (\$12.00) per hour. Fringes shall be paid at the straight time rate.

(Local #46)

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## **MILLWRIGHT**

### **Millwright**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$47.69

Supplemental Benefit Rate per Hour: \$48.87

### **Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Presidential Election Day  
Thanksgiving Day  
Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

### **Paid Holidays**

1/2 day on Christmas Eve if work is performed in the A.M.  
1/2 day on New Year's Eve if work is performed in the A.M.

### **Shift Rates**

The first shift shall receive the straight time rate of pay. The second shift receives the straight time rate of pay plus fifteen (15%) per cent. Members of the second shift shall be allowed one half hour to eat, with this time being included in the hours of the workday established. There must be a first shift to work a second shift. All additional hours worked shall be paid at the time and one-half rate of pay plus fifteen (15%) per cent for weekday hours.

(Local #740)

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## **MOSAIC MECHANIC**

### **Mosaic Mechanic - Mosaic & Terrazzo Mechanic**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$44.39**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

### **Mosaic Mechanic - Mosaic & Terrazzo Finisher**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.78**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

### **Mosaic Mechanic - Machine Operator Grinder**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: **\$42.78**

Supplemental Benefit Rate per Hour: **\$35.11**

Supplemental Note: Supplemental benefits for overtime to be paid at the rate of \$46.08 per hour.

### **Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### **Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Good Friday

Independence Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

(Local #7)

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**PAINTER**

**Painter - Brush & Roller**

Effective Period: 7/1/2013 - 4/30/2014  
Wage Rate per Hour: \$37.50  
Supplemental Benefit Rate per Hour: \$25.62  
Supplemental Note: \$30.25 on overtime

Effective Period: 5/1/2014 - 6/30/2014  
Wage Rate per Hour: \$39.50  
Supplemental Benefit Rate per Hour: \$26.12  
Supplemental Note: \$30.75 on overtime

**Spray & Scaffold / Decorative / Sandblast**

Effective Period: 7/1/2013 - 4/30/2014  
Wage Rate per Hour: \$40.50  
Supplemental Benefit Rate per Hour: \$25.62  
Supplemental Note: \$30.25 on overtime

Effective Period: 5/1/2014 - 6/30/2014  
Wage Rate per Hour: \$42.50  
Supplemental Benefit Rate per Hour: \$26.12  
Supplemental Note: \$30.75 on overtime

**Overtime**

Time and one half the regular rate after a 7 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Labor Day  
Columbus Day  
Thanksgiving Day  
Christmas Day

**Paid Holidays**  
None

(District Council of Painters #9)

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**PAINTER - SIGN**

Designer

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$36.15  
Supplemental Benefit Rate per Hour: \$9.66

Journey person

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$33.62  
Supplemental Benefit Rate per Hour: \$9.66

**Overtime**

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.  
Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Shift Rates**

All work performed outside the regular 8 hour work day (either 7:00 A.M to 3:30 P.M or 8:00 A.M. to 4:30 P.M) shall be paid at time and one half the regular hourly rate.

(Local #8A-28A)

## PAINTER - STRIPER

### Striper (paint)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$33.50

Supplemental Benefit Rate per Hour: \$11.62

Supplemental Note: Overtime Supplemental Benefit rate - \$7.42; New Hire Rate (0-3 months) - \$0.00

### Lineperson (thermoplastic)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$37.50

Supplemental Benefit Rate per Hour: \$11.62

Supplemental Note: Overtime Supplemental Benefit rate - \$7.42; New Hire Rate (0-3 months) - \$0.00

### **Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

### **Paid Holidays**

New Year's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### **Shift Rates**

Employees hired before April 1, 2003: 15% night shift premium differential for work commenced at 9:00 PM or later.

### **Vacation**

Employees with one to two years service shall accrue vacation based on hours worked: 250 hours worked - 1 day vacation; 500 hours worked - 2 days vacation; 750 hours worked - 3 days vacation; 900 hours worked - 4 days vacation; 1,000 hours worked - 5 days vacation. Employees with two to five years service receive two weeks vacation. Employees with five to twenty years service receive three weeks vacation. Employees with twenty to twenty-five years service receive four weeks vacation. Employees with 25 or more years service receive five weeks vacation. Vacation must be taken during winter months. 2 Personal Days except employees hired after 4/1/12 who do not have 2 years of service.

(Local #917)

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## PAINTER - STRUCTURAL STEEL

### Painters on Structural Steel

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$47.00

Supplemental Benefit Rate per Hour: \$32.08

### Painter - Power Tool

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$53.00

Supplemental Benefit Rate per Hour: \$32.08

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

Regular hourly rates plus a ten per cent (10%) differential

(Local #806)

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## PAPERHANGER

### Paperhanger

Effective Period: 7/1/2013 - 4/30/2014

Wage Rate per Hour: \$39.00

Supplemental Benefit Rate per Hour: \$29.23

Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

Effective Period: 5/1/2014 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$41.08

Supplemental Benefit Rate per Hour: \$29.23

Supplemental Note: Supplemental benefits are to be paid at the appropriate straight time and overtime rate.

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

### Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### Paid Holidays

None

### Shift Rates

Evening shift - 4:30 P.M. to 12:00 Midnight (regular rate of pay); any work performed before 7:00 A.M. shall be at time and one half the regular base rate of pay.

(District Council of Painters #9)

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## PAVER AND ROADBUILDER

### Paver & Roadbuilder - Formsetter

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$43.54

Supplemental Benefit Rate per Hour: \$33.55

### Paver & Roadbuilder - Laborer

Paving and road construction work, regardless of material used, including but not limited to preparation of job sites, removal of old surfaces, asphalt and/or concrete, by whatever method, including but not limited to milling; laying of concrete; laying of asphalt for temporary, patchwork, and utility paving (but not production paving); site preparation and incidental work before the installation of rubberized materials and similar surfaces; installation and repair of temporary construction fencing; slurry seal coating, maintenance of safety surfaces; play equipment installation, and other related work.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.67

Supplemental Benefit Rate per Hour: \$33.55

### Production Paver & Roadbuilder - Screed Person

(Production paving is asphalt paving when using a paving machine or on a project where a paving machine is traditionally used)

Adjustment of paving machinery on production paving jobs.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.12

Supplemental Benefit Rate per Hour: \$33.55

### Production Paver & Roadbuilder - Raker

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$44.61

Supplemental Benefit Rate per Hour: \$33.55

### Production Paver & Roadbuilder - Shoveler

General laborer (except removal of surfaces - see Paver and Roadbuilder-Laborer) including but not limited to tamper, AC paint and liquid tar work.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$41.32

Supplemental Benefit Rate per Hour: \$33.55

### **Overtime Description**

Veteran's Day is a Paid Holiday for employees working on production paving.

If an employee works New Year's Day or Christmas Day, they receive the single time rate plus 25%.

Employees who work on a holiday listed below receive the straight time rate plus one day's pay for the holiday.

### **Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### **Paid Holidays**

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

### **Shift Rates**

When two shifts are employed, the work period for each shift shall be a continuous eight (8) hours. When three shifts are employed, each shift will work seven and one half (7 ½) hours but will be paid for eight (8) hours since only one half (1/2) hour is allowed for meal time.

When two or more shifts are employed, single time will be paid for each shift.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Night Work - On night work, the first eight (8) hours of work will be paid for at the single time rate, except that production paving work shall be paid at 20% over the single time rate for the screed person, rakers and shovelers directly involved only. All other workers will be exempt. Hours worked over eight (8) hours during said shift shall be paid for at the time and one-half rate.

(Local #1010)

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## PLASTERER

### Plasterer

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$41.13

Supplemental Benefit Rate per Hour: \$24.95

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

When it is not possible to conduct alteration work during regular work hours, in a building occupied by tenants, said work shall proceed on a shift basis: however work over seven (7) hours in any twenty four (24) hour period, the time after seven (7) hours shall be considered overtime.

The second shift shall start at a time between 3:30 p.m. and 7:00 p.m. and shall consist of seven (7) working hours and shall receive eight (8) hours of wages and benefits at the straight time rate. The workers on the second shift shall be allowed one-half (½) hour to eat with this time being included in the seven (7) hours of work.

(Local #530)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

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## PLASTERER - TENDER

### Plasterer - Tender

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.00

Supplemental Benefit Rate per Hour: \$25.74

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

When work commences outside regular work hours, workers receive an hour additional (differential) wage and supplement payment. Eight hours pay for seven hours work or nine hours pay for eight hours work.

(Mason Tenders District Council)

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## PLUMBER

### Plumber

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$52.36

Supplemental Benefit Rate per Hour: \$37.34

Supplemental Note: Overtime supplemental benefit rate per hour: \$74.40

### Overtime Description

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Double time the regular rate after a 7 hour day - unless for new construction site work where the plumbing contract price is \$1.5 million or less, the hours of labor can be 8 hours per day at the employers option. On Alteration jobs when other mechanical trades at the site are working an eighth hour at straight time, then the plumber shall also work an eighth hour at straight time.

### Overtime

Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Shift Rates

Shift work, when directly specified in public agency or authority documents where plumbing contract is \$8 million or less, will be permitted. 30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday. 50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

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**PLUMBER (MECHNICAL EQUIPMENT AND SERVICE)**  
(Mechanical Equipment and Service work shall include any repair and/or replacement of the present plumbing system.)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$33.46

Supplemental Benefit Rate per Hour: \$16.93

### Overtime

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

### Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).  
New Year's Day  
President's Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Memorial Day  
Independence Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Paid Holidays**

None

(Plumbers Local # 1)

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**PLUMBER (RESIDENTIAL RATES FOR 1, 2 AND 3 FAMILY HOME  
CONSTRUCTION)**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$37.11

Supplemental Benefit Rate per Hour: \$25.56

**Overtime**

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Paid Holidays**

None

**Shift Rates**

30% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shifts Monday to Friday.

50% shift premium shall be paid for wages and fringe benefits for 4:00 pm and midnight shift work performed on weekends. For shift work on holidays, double time wages and fringe benefits shall be paid.

(Plumbers Local #1)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**PLUMBER: PUMP & TANK**  
(Installation and Maintenance)

**Plumber - Pump & Tank**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$53.01

Supplemental Benefit Rate per Hour: \$31.86

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Paid Holidays**

None

**Shift Rates**

All work outside the regular workday (8:00 A.M. to 3:30 P.M.) is to be paid at time and one half the regular hourly rate

(Plumbers Local #1)

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**POINTER - WATERPROOFER, CAULKER MECHANIC (EXTERIOR BUILDING RENOVATION)**

**Pointer - Waterproofer, Caulker Mechanic**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.41

Supplemental Benefit Rate per Hour: \$23.29

**Overtime**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

### Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

All work outside the regular work day (an eight hour workday between the hours of 6:00 A.M. and 4:30 P.M.) is to be paid at time and one half the regular rate.

(Bricklayer District Council)

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## ROOFER

### Roofer

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.00

Supplemental Benefit Rate per Hour: \$27.37

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

### Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Presidential Election Day

Thanksgiving Day

Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Paid Holidays**

None

**Shift Rates**

Second shift - Regular hourly rate plus a 10% differential. Third shift - Regular hourly rate plus a 15% differential.

(Local #8)

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**SANDBLASTER - STEAMBLASTER  
(Exterior Building Renovation)**

**Sandblaster / Steamblaster**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.41

Supplemental Benefit Rate per Hour: \$23.29

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

**Overtime Holidays**

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

**Shift Rates**

All work outside the regular work day (an eight hour workday between the hours of 6:00 A.M. and 4:30 P.M.) is to be paid at time and one half the regular rate.

(Bricklayer District Council)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

## SHEET METAL WORKER

### Sheet Metal Worker

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.96

Supplemental Benefit Rate per Hour: \$43.19

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

### Sheet Metal Worker - Duct Cleaner

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$12.90

Supplemental Benefit Rate per Hour: \$8.07

### Sheet Metal Worker - Fan Maintenance

(The temporary operation of fans or blowers in new or existing buildings for heating and/or ventilation, and/or air conditioning prior to the completion of the project.)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$36.77

Supplemental Benefit Rate per Hour: \$43.19

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

### Paid Holidays

None

### Shift Rates

Work that can only be performed outside regular working hours (seven hours of work between 7:30 A.M. and 3:30 P.M.) - First shift (work between 3:30 P.M. and 11:30 P.M.) - 10% differential above the established hourly rate.

Second shift (work between 11:30 P.M. and 7:30 A.M.) - 15% differential above the established hourly rate.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

For Fan Maintenance: On all full shifts of fan maintenance work the straight time hourly rate of pay will be paid for each shift, including nights, Saturdays, Sundays, and holidays. No journeyman engaged in fan maintenance shall work in excess of forty (40) hours in any work week.

(Local #28)

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**SHEET METAL WORKER - SPECIALTY**  
**(Decking & Siding)**

**Sheet Metal Specialty Worker**

The first worker to perform this work must be paid at the rate of the Sheet Metal Worker. The second and third workers shall be paid the Specialty Worker Rate. The ratio of One Sheet Metal Worker, then Two Specialty Workers shall be utilized thereafter.

Effective Period: 7/1/2013 - 7/31/2013

Wage Rate per Hour: \$41.28

Supplemental Benefit Rate per Hour: \$22.88

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

Effective Period: 8/1/2013 - 6/30/2014

Wage Rate per Hour: \$40.78

Supplemental Benefit Rate per Hour: \$23.38

Supplemental Note: Supplemental benefit contributions are to be made at the applicable overtime rates.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

**Paid Holidays**

None

(Local #28)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

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**SIGN ERECTOR**  
(Sheet Metal, Plastic, Electric, and Neon)

Sign Erector

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.80

Supplemental Benefit Rate per Hour: \$42.17

**Overtime**

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

Time and one half the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

**Shift Rates**

Time and one half the regular hourly rate is to be paid for all hours worked outside the regular workday either (7:00 A.M. through 2:30 P.M.) or (8:00 A.M. through 3:30 P.M.)

(Local #137)

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**STEAMFITTER**

Steamfitter I

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$52.50

Supplemental Benefit Rate per Hour: \$50.54

Supplemental Note: Overtime supplemental benefit rate: \$100.34

**Overtime**

Double time the regular rate after a 7 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Paid Holidays

None

### Shift Rates

Work performed between 3:30 P.M. and 7:00 A.M. and on Saturdays, Sundays and Holidays shall be at double time the regular hourly rate and paid at the overtime supplemental benefit rate above.

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## Steamfitter II

For heating, ventilation, air conditioning and mechanical public works contracts with a dollar value not to exceed \$15,000,000 and for fire protection/sprinkler public works contracts not to exceed \$1,500,000.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$52.50

Supplemental Benefit Rate per Hour: \$50.54

Supplemental Note: Overtime supplemental benefit rate: \$100.34

### Overtime

Double time the regular rate after an 8 hour day.  
Double time the regular time rate for Saturday.  
Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Paid Holidays**

None

**Shift Rates**

May be performed outside of the regular workday except Saturday, Sunday and Holidays. A shift shall consist of eight working hours. All work performed in excess of eight hours shall be paid at double time. No shift shall commence after 7:00 P.M. on Friday or 7:00 P.M. the day before holidays. All work performed after 12:01 A.M. Saturday or 12:01 A.M. the day before a Holiday will be paid at double time. When shift work is performed the wage rate for regular time worked is a thirty percent premium together with fringe benefits.

On Transit Authority projects, where work is performed in the vicinity of tracks all shift work on weekends and holidays may be performed at the regular shift rates.

Local #638

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**STEAMFITTER - REFRIGERATION AND AIR CONDITIONER  
(Maintenance and Installation Service Person)**

**Refrigeration and Air Conditioner Mechanic**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$38.05  
Supplemental Benefit Rate per Hour: \$12.26

**Refrigeration and Air Conditioner Service Person V**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$31.26  
Supplemental Benefit Rate per Hour: \$11.13

**Refrigeration and Air Conditioner Service Person IV**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$25.90  
Supplemental Benefit Rate per Hour: \$10.16

**Refrigeration and Air Conditioner Service Person III**

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$22.23  
Supplemental Benefit Rate per Hour: \$9.44

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**Refrigeration and Air Conditioner Service Person II**

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$18.44

Supplemental Benefit Rate per Hour: \$8.78

**Refrigeration and Air Conditioner Service Person I**

Filter changing and maintenance thereof, oil and greasing, tower and coil cleaning, scraping and painting, general housekeeping, taking of water samples.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$13.48

Supplemental Benefit Rate per Hour: \$8.10

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

New Year's Day

Independence Day

Labor Day

Veteran's Day

Thanksgiving Day

Christmas Day

Double time and one half the regular rate for work on the following holiday(s).

Martin Luther King Jr. Day

President's Day

Memorial Day

Columbus Day

**Paid Holidays**

New Year's Day

Martin Luther King Jr. Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Veteran's Day

Thanksgiving Day

Christmas Day

(Local #638B)

## STONE MASON - SETTER

### Stone Mason - Setters

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$47.72

Supplemental Benefit Rate per Hour: \$35.28

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

Washington's Birthday

Good Friday

Memorial Day

Independence Day

Labor Day

Thanksgiving Day

Christmas Day

### Paid Holidays

1/2 day on Christmas Eve if work is performed in the A.M.

### Shift Rates

For all work outside the regular workday (8:00 A.M. to 3:30 P.M. Monday through Friday), the pay shall be straight time plus a ten percent (10%) differential.

(Bricklayers District Council)

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## TAPER

### Drywall Taper

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$44.32

Supplemental Benefit Rate per Hour: \$21.66

Effective Period: 1/1/2014 - 6/24/2014

Wage Rate per Hour: \$44.82

Supplemental Benefit Rate per Hour: \$21.66

Effective Period: 6/25/2014 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$45.32

Supplemental Benefit Rate per Hour: \$21.66

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

### Overtime Holidays

Time and one half the regular rate for work on the following holiday(s).

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Christmas Day

### Paid Holidays

Any worker who reports to work on Christmas Eve or New Year's Eve pursuant to his employer's instruction shall be entitled to three (3) hours afternoon pay without working.

### Shift Rates

Time and one half the regular rate outside the regular work hours (8:00 A.M. through 3:30 P.M.)

(Local #1974)

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## TELECOMMUNICATION WORKER (Voice Installation Only)

### Telecommunication Worker

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$35.94

Supplemental Benefit Rate per Hour: \$13.19

Supplemental Note: The above rate applies for Manhattan, Bronx, Brooklyn, Queens. \$12.64 for Staten Island only.

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Time and one half the regular rate for Sunday.

### Overtime Holidays

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Time and one half the regular rate for work on the following holiday(s).

New Year's Day  
Lincoln's Birthday  
Washington's Birthday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

### **Paid Holidays**

New Year's Day  
Lincoln's Birthday  
Washington's Birthday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Veteran's Day  
Thanksgiving Day  
Christmas Day

Employees have the option of observing either Martin Luther King's Birthday or the day after Thanksgiving instead of Lincoln's Birthday

### **Shift Rates**

For any workday that starts before 8A.M. or ends after 6P.M. there is a 10% differential for the applicable worker's hourly rate.

### **Vacation**

After 6 months.....one week.  
After 12 months but less than 7 years.....two weeks.  
After 7 or more but less than 15 years.....three weeks.  
After 15 years or more but less than 25 years.....four weeks.

(C.W.A.)

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## **TILE FINISHER**

### **Tile Finisher**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$38.49

Supplemental Benefit Rate per Hour: \$27.40

### **Overtime**

Time and one half the regular rate after a 7 hour day.  
Time and one half the regular rate for Saturday.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

### Paid Holidays

None

### Shift Rates

Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

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## TILE LAYER - SETTER

### Tile Layer - Setter

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$48.35

Supplemental Benefit Rate per Hour: \$31.44

### Overtime

Time and one half the regular rate after a 7 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Veteran's Day  
Thanksgiving Day  
Day after Thanksgiving

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

Christmas Day

### Shift Rates

Off shift work day (work performed outside the regular 8:00 A.M. to 3:30 P.M. workday): shift differential of one and one quarter (1¼) times the regular straight time rate of pay for the seven hours of actual off-shift work.

(Local #7)

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## TIMBERPERSON

### Timberperson

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$42.63

Supplemental Benefit Rate per Hour: \$44.54

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Saturday may be used as a make-up day at straight time when a day is lost during that week to inclement weather.

Time and one half the regular hourly rate after 40 hours in any work week.

### Overtime Holidays

Double time the regular rate for work on the following holiday(s).

New Year's Day

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Presidential Election Day

Thanksgiving Day

Christmas Day

### Paid Holidays

None

### Shift Rates

Off shift work commencing between 5:00 P.M. and 11:00 P.M. shall work eight and one half hours allowing for one half hour for lunch. The wage rate shall be 113% of the straight time hourly wage rate.

(Local #1536)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 PREVAILING WAGE SCHEDULE

**TUNNEL WORKER**

**Blasters, Mucking Machine Operators (Compressed Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$54.20  
Supplemental Benefit Rate per Hour: \$48.20

**Tunnel Workers (Compressed Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$52.31  
Supplemental Benefit Rate per Hour: \$46.59

**Top Nipper (Compressed Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$51.35  
Supplemental Benefit Rate per Hour: \$45.78

**Outside Lock Tender, Outside Gauge Tender, Muck Lock Tender (Compressed Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$50.42  
Supplemental Benefit Rate per Hour: \$44.91

**Bottom Bell & Top Bell Signal Person: Shaft Person (Compressed Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$50.42  
Supplemental Benefit Rate per Hour: \$44.92

**Changehouse Attendant: Powder Watchperson (Compressed Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$43.94  
Supplemental Benefit Rate per Hour: \$42.55

**Blasters (Free Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$51.72  
Supplemental Benefit Rate per Hour: \$46.03

**Tunnel Workers (Free Air Rates)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$49.48

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Supplemental Benefit Rate per Hour: \$44.06

All Others (Free Air Rates)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$45.73

Supplemental Benefit Rate per Hour: \$40.75

Microtunneling (Free Air Rates)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$39.58

Supplemental Benefit Rate per Hour: \$35.25

**Overtime Description**

For Repair-Maintenance Work on Existing Equipment and Facilities - Time and one half the regular rate after a 7 hour day, or for Saturday, or for Sunday. Double time the regular rate for work on a holiday.

For Small-Bore Micro Tunneling Machines - Time and one-half the regular rate shall be paid for all overtime.

**Overtime**

Double time the regular rate after an 8 hour day.

Double time the regular time rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

**Paid Holidays**

New Year's Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

Veteran's Day

Thanksgiving Day

Christmas Day

(Local #147)

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**WELDER**

TO BE PAID AT THE RATE OF THE JOURNEYPERSON IN THE TRADE  
PERFORMING THE WORK.

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**OFFICE OF THE COMPTROLLER**

**CITY OF NEW YORK**

**220 APPRENTICESHIP PREVAILING WAGE SCHEDULE**

**APPENDIX**

Pursuant to Labor Law §220 (3-e), only apprentices who are individually registered in a bona fide program to which the employer contractor is a participant and registered with the New York State Department of Labor, may be employed on a public work project.

Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the journey person wage rate for the classification of work he actually performed.

Apprentice ratios are established to ensure the proper safety, training and supervision of apprentices. A ratio establishes the number of journey workers required for each apprentice in a program and on a job site. Ratios are interpreted as follows: in the case of a 1:1, 1:4 ratio, there must be one journey worker for the first apprentice, and four additional journey workers for each subsequent apprentice.

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## ASBESTOS HANDLER

(Ratio of Apprentice Journeyman: 1 to 1, 1 to 3)

### Asbestos Handler (First 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 78% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$15.05

### Asbestos Handler (Second 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$15.05

### Asbestos Handler (Third 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 83% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$15.05

### Asbestos Handler (Fourth 1000 Hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 89% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$15.05

(Local #78)

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## BOILERMAKER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

### Boilermaker (First Year)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$28.75

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$29.74

### Boilermaker (Second Year: 1st Six Months)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$30.33

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$31.40

**Boilermaker (Second Year: 2nd Six Months)**

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$31.91

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$33.05

**Boilermaker (Third Year: 1st Six Months)**

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$33.49

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$34.69

**Boilermaker (Third Year: 2nd Six Months)**

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate Per Hour: 85% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$35.05

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate Per Hour: 85% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$36.34

**Boilermaker (Fourth Year: 1st Six Months)**

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate Per Hour: 90% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$36.63

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate Per Hour: 90% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$38.00

**Boilermaker (Fourth Year: 2nd Six Months)**

Effective Period: 7/1/2013 - 12/31/2013

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Wage Rate Per Hour: 95% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$38.19

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate Per Hour: 95% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$39.65

(Local #5)

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## BRICKLAYER

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

### Bricklayer (First 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

### Bricklayer (Second 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

### Bricklayer (Third 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

### Bricklayer (Fourth 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

### Bricklayer (Fifth 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 90% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$16.60

### Bricklayer (Sixth 750 Hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 95% of Journeyperson's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate Per Hour: \$16.60

(Bricklayer District Council)

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**CARPENTER**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Carpenter (First Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.29

Carpenter (Second Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.29

Carpenter (Third Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.29

Carpenter (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.29

(Carpenters District Council)

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**CEMENT MASON**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Cement Mason (First Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 50% of Journeyman's Rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Cement Mason (Second Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 60% of Journeyman's Rate

Cement Mason (Third Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 70% of Journeyman's Rate

(Local #780)

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**CEMENT AND CONCRETE WORKER**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Cement & Concrete Worker (0 - 500 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 50% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$18.04

Cement & Concrete Worker (501 - 1000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$18.87

Cement & Concrete Worker (1001 - 2000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 65% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$24.25

Cement & Concrete Worker (2001 - 4000 hours)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Benefit Rate Per Hour: \$25.07

(Cement Concrete Workers District Council)

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**DERRICKPERSON & RIGGER (STONE)**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)

**Derrickperson & Rigger (stone) - First Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 50% of Journeyman's rate

**Derrickperson & Rigger (stone) - Second Year: 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

**Derrickperson & Rigger (stone) - Second Year: 2nd Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

**Derrickperson & Rigger (stone) - Third Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 90% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: 75% of Journeyman's rate

(Local #197)

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**DOCKBUILDER/PILE DRIVER**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 6)

**Dockbuilder/Pile Driver (First Year)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.29

**Dockbuilder/Pile Driver (Second Year)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Benefit Rate Per Hour: \$30.29

Dockbuilder/Pile Driver (Third Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$30.29

Dockbuilder/Pile Driver (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Benefit Rate Per Hour: \$30.29

(Carpenters District Council)

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**ELECTRICIAN**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Electrician (First Term: 0-6 Months)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$12.50  
Supplemental Benefit Rate per Hour: \$10.86  
Overtime Supplemental Rate per Hour: \$11.68

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$12.50  
Supplemental Benefit Rate per Hour: \$11.10  
Overtime Supplemental Rate per Hour: \$11.93

Electrician (First Term: 7-12 Months)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$13.50  
Supplemental Benefit Rate per Hour: \$11.37  
Overtime Supplemental Rate per Hour: \$12.26

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$13.50  
Supplemental Benefit Rate per Hour: \$11.62  
Overtime Supplemental Rate per Hour: \$12.51

Electrician (Second Term: 0-6 Months)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$14.50

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Supplemental Benefit Rate per Hour: \$11.88  
Overtime Supplemental Rate per Hour: \$12.83

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$14.50  
Supplemental Benefit Rate per Hour: \$12.13  
Overtime Supplemental Rate per Hour: \$13.08

Electrician (Second Term: 7-12 Months)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$15.50  
Supplemental Benefit Rate per Hour: \$12.39  
Overtime Supplemental Rate per Hour: \$13.41

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$15.50  
Supplemental Benefit Rate per Hour: \$12.64  
Overtime Supplemental Rate per Hour: \$13.66

Electrician (Third Term: 0-6 Months)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$16.50  
Supplemental Benefit Rate per Hour: \$12.90  
Overtime Supplemental Rate per Hour: \$13.98

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$16.50  
Supplemental Benefit Rate per Hour: \$13.15  
Overtime Supplemental Rate per Hour: \$14.23

Electrician (Third Term: 7-12 Months)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$17.50  
Supplemental Benefit Rate per Hour: \$13.40  
Overtime Supplemental Rate per Hour: \$14.56

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$17.50  
Supplemental Benefit Rate per Hour: \$13.65  
Overtime Supplemental Rate per Hour: \$14.81

Electrician (Fourth Term: 0-6 Months - Hired on or after 5/10/07)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$18.50  
Supplemental Benefit Rate per Hour: \$13.91  
Overtime Supplemental Rate per Hour: \$15.13

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Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$18.50  
Supplemental Benefit Rate per Hour: \$14.16  
Overtime Supplemental Rate per Hour: \$15.38

Electrician (Fourth Term: 7-12 Months - Hired on or after 5/10/07)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$20.25  
Supplemental Benefit Rate per Hour: \$14.80  
Overtime Supplemental Rate per Hour: \$16.14

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$20.50  
Supplemental Benefit Rate per Hour: \$15.18  
Overtime Supplemental Rate per Hour: \$16.53

Electrician (Fifth Term: 0-12 Months - Hired on or after 5/10/07)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$22.00  
Supplemental Benefit Rate per Hour: \$17.30  
Overtime Supplemental Rate per Hour: \$18.68

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$22.50  
Supplemental Benefit Rate per Hour: \$18.06  
Overtime Supplemental Rate per Hour: \$19.47

Electrician (Fifth Term: 13-18 Months - Hired on or after 5/10/07)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$26.50  
Supplemental Benefit Rate per Hour: \$19.56  
Overtime Supplemental Rate per Hour: \$21.23

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$27.00  
Supplemental Benefit Rate per Hour: \$20.32  
Overtime Supplemental Rate per Hour: \$22.01

Electrician (Fourth Term: 0-6 Months - Hired before 5/10/07)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$22.10  
Supplemental Benefit Rate per Hour: \$15.74  
Overtime Supplemental Rate per Hour: \$17.20

Effective period: 5/14/2014 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$22.10  
Supplemental Benefit Rate per Hour: \$15.99  
Overtime Supplemental Rate per Hour: \$17.45

Electrician (Fourth Term: 7-12 Months - Hired before 5/10/07)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$23.95  
Supplemental Benefit Rate per Hour: \$16.69  
Overtime Supplemental Rate per Hour: \$18.26

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$24.20  
Supplemental Benefit Rate per Hour: \$17.06  
Overtime Supplemental Rate per Hour: \$18.66

Electrician (Fifth Term: 0-18 Months - Hired before 5/10/07)

Effective period: 7/1/2013 - 5/13/2014  
Wage Rate per Hour: \$25.80  
Supplemental Benefit Rate per Hour: \$19.21  
Overtime Supplemental Rate per Hour: \$20.83

Effective period: 5/14/2014 - 6/30/2014  
Wage Rate per Hour: \$26.30  
Supplemental Benefit Rate per Hour: \$19.96  
Overtime Supplemental Rate per Hour: \$21.61

**Overtime Description**

Overtime Wage paid at time and one half the regular rate  
For "A" rated Apprentices (work in excess of 7 hours per day)  
For "M" rated Apprentices (work in excess of 8 hours per day)

(Local #3)

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**ELEVATOR CONSTRUCTOR**  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Elevator (Constructor) - First Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Rate Per Hour: \$26.87

Elevator (Constructor) - Second Year

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 55% of Journeyperson's rate  
Supplemental Rate Per Hour: \$27.92

Elevator (Constructor) - Third Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Rate Per Hour: \$29.38

Elevator (Constructor) - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Rate Per Hour: \$30.84

(Local #1)

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**ELEVATOR REPAIR & MAINTENANCE**  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 2)

Elevator Service/Modernization Mechanic (First Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$26.79

Elevator Service/Modernization Mechanic (Second Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 55% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$27.12

Elevator Service/Modernization Mechanic (Third Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$28.43

Elevator Service/Modernization Mechanic (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Benefit Per Hour: \$29.74

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

(Local #1)

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**ENGINEER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Engineer - First Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$22.49

Supplemental Benefit Rate per Hour: \$20.68

Engineer - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$28.11

Supplemental Benefit Rate per Hour: \$20.68

Engineer - Third Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$20.92

Supplemental Benefit Rate per Hour: \$20.68

Engineer - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$33.73

Supplemental Benefit Rate per Hour: \$20.68

(Local #15)

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**ENGINEER - OPERATING**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 5)

Operating Engineer - First Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour 40% of Journeyperson's Rate

Supplemental Benefit Per Hour: \$18.60

Operating Engineer - Second Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's Rate  
Supplemental Benefit Per Hour: \$18.60

Operating Engineer - Third Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyperson's Rate  
Supplemental Benefit Per Hour: \$18.60

(Local #14)

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**FLOOR COVERER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Floor Coverer (First Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyperson's rate  
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Second Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Third Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Rate Per Hour: \$25.75

Floor Coverer (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Rate Per Hour: \$25.75

(Carpenters District Council)

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**GLAZIER**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

Glazier (First Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyman's rate  
Supplemental Rate Per Hour: \$11.97

Glazier (Second Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$21.13

Glazier (Third Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$23.54

Glazier (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$28.34

(Local #1281)

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**HEAT & FROST INSULATOR**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

Heat & Frost Insulator (First Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 40% of Journeyman's rate

Heat & Frost Insulator (Second Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 60% of Journeyman's rate

Heat & Frost Insulator (Third Year)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 70% of Journeyperson's rate

Heat & Frost Insulator (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #12)

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HOUSE WRECKER  
(TOTAL DEMOLITION)  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

House Wrecker - First Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$20.36  
Supplemental Benefit Rate per Hour: \$16.35

House Wrecker - Second Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$21.46  
Supplemental Benefit Rate per Hour: \$16.35

House Wrecker - Third Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$23.01  
Supplemental Benefit Rate per Hour: \$16.35

House Wrecker - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$25.36  
Supplemental Benefit Rate per Hour: \$16.35

(Local #79)

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**IRON WORKER - ORNAMENTAL**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

**Iron Worker (Ornamental) - 1st Four Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$35.78

**Iron Worker (Ornamental) 5 - 10 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyman's rate  
Supplemental Rate Per Hour: \$36.75

**Iron Worker (Ornamental) 11 - 16 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 70% of Journeyman's rate  
Supplemental Rate Per Hour: \$37.72

**Iron Worker (Ornamental) 17 - 22 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyman's rate  
Supplemental Rate Per Hour: \$39.66

**Iron Worker (Ornamental) 23 - 28 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 85% of Journeyman's rate  
Supplemental Rate Per Hour: \$40.63

**Iron Worker (Ornamental) 29 - 36 Months - Hired on or Before 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 95% of Journeyman's rate  
Supplemental Rate Per Hour: \$42.57

**Iron Worker (Ornamental) - 1st Ten Months - Hired After 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.84

**Iron Worker (Ornamental) - 11 - 16 Months - Hired After 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 55% of Journeyman's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Supplemental Rate Per Hour: \$34.81

**Iron Worker (Ornamental) - 17 - 22 Months - Hired After 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyperson's rate  
Supplemental Rate Per Hour: \$35.78

**Iron Worker (Ornamental) - 23 - 28 Months - Hired After 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Rate Per Hour: \$37.72

**Iron Worker (Ornamental) - 29 - 36 Months - Hired After 8/1/08**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Rate Per Hour: \$39.66

(Local #580)

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**IRON WORKER - STRUCTURAL**  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

**Iron Worker (Structural) - 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$24.48  
Supplemental Benefit Rate per Hour: \$43.87

**Iron Worker (Structural) - 7- 18 Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$25.08  
Supplemental Benefit Rate per Hour: \$43.87

**Iron Worker (Structural) - 19 - 36 months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$25.68  
Supplemental Benefit Rate per Hour: \$43.87

(Local #40 and #361)

**LABORER (FOUNDATION, CONCRETE, EXCAVATING, STREET PIPE LAYER & COMMON)**

(Ratio Apprentice to Journeyman: 1 to 1, 1 to 3)

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - First 1000 hours**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.25

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Second 1000 hours**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.25

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Third 1000 hours**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 75% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.25

**Laborer (Foundation, Concrete, Excavating, Street Pipe Layer & Common) - Fourth 1000 hours**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 90% of Journeyman's rate  
Supplemental Rate Per Hour: \$33.25

(Local #731)

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**MARBLE MECHANICS**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

**Cutters & Setters - First 750 Hours**

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Cutters & Setters - Second 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Cutters & Setters - Third 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Cutters & Setters - Fourth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Cutters & Setters - Fifth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Cutters & Setters - Sixth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

Polishers & Finishers - First 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

NO BENEFITS PAID DURING THE FIRST TWO MONTHS (PROBATIONARY PERIOD)

Polishers & Finishers - Second 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Polishers & Finishers - Third 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Polishers & Finishers - Fourth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 90% of Journeyperson's rate

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

(Local #7)

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**MASON TENDER**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

**Mason Tender - First Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$20.63  
Supplemental Benefit Rate per Hour: \$17.06

**Mason Tender - Second Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$21.73  
Supplemental Benefit Rate per Hour: \$17.06

**Mason Tender - Third Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$23.33  
Supplemental Benefit Rate per Hour: \$17.06

**Mason Tender - Fourth Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$25.93  
Supplemental Benefit Rate per Hour: \$17.06

(Local #79)

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**METALLIC LATHER**  
(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

**Metallic Lather (First Year -Called Prior to 6/29/11)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$28.11

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Supplemental Benefit Rate per Hour: \$22.79

Metallic Lather (Second Year - Called Prior to 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$32.71

Supplemental Benefit Rate per Hour: \$24.44

Metallic Lather (Third Year - Called Prior to 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$37.77

Supplemental Benefit Rate per Hour: \$25.59

Metallic Lather (First Year -Called On Or After 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$17.71

Supplemental Benefit Rate per Hour: \$19.85

Metallic Lather (Second Year - Called On Or After 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$22.81

Supplemental Benefit Rate per Hour: \$19.85

Metallic Lather (Third Year - Called On Or After 6/29/11)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$27.91

Supplemental Benefit Rate per Hour: \$19.85

(Local #46)

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**MILLWRIGHT**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Millwright (First Year)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$26.23

Supplemental Benefit Rate per Hour: \$31.51

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Millwright (Second Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$31.00  
Supplemental Benefit Rate per Hour: \$34.77

Millwright (Third Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$35.77  
Supplemental Benefit Rate per Hour: \$39.19

Millwright (Fourth Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$45.30  
Supplemental Benefit Rate per Hour: \$44.63

(Local #740)

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**PAVER AND ROADBUILDER**  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Paver and Roadbuilder - First Year (Minimum 1000 hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$26.19  
Supplemental Benefit Rate per Hour: \$16.20

Paver and Roadbuilder - Second Year (Minimum 1000 hours)

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$27.77  
Supplemental Benefit Rate per Hour: \$16.20

(Local #1010)

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**PAINTER**  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

**Painter - Brush & Roller - First Year**

Effective Period: 7/1/2013 - 4/30/2014  
Wage Rate per Hour: \$15.00  
Supplemental Benefit Rate per Hour: \$11.38

Effective Period: 5/1/2014 - 6/30/2014  
Wage Rate per Hour: \$15.80  
Supplemental Benefit Rate per Hour: \$11.88

**Painter - Brush & Roller - Second Year**

Effective Period: 7/1/2013 - 4/30/2014  
Wage Rate per Hour: \$18.75  
Supplemental Benefit Rate per Hour: \$15.23

Effective Period: 5/1/2014 - 6/30/2014  
Wage Rate per Hour: \$19.75  
Supplemental Benefit Rate per Hour: \$15.73

**Painter - Brush & Roller - Third Year**

Effective Period: 7/1/2013 - 4/30/2014  
Wage Rate per Hour: \$22.50  
Supplemental Benefit Rate per Hour: \$18.14

Effective Period: 5/1/2014 - 6/30/2014  
Wage Rate per Hour: \$23.70  
Supplemental Benefit Rate per Hour: \$18.64

**Painter - Brush & Roller - Fourth Year**

Effective Period: 7/1/2013 - 4/30/2014  
Wage Rate per Hour: \$30.00  
Supplemental Benefit Rate per Hour: \$23.52

Effective Period: 5/1/2014 - 6/30/2014  
Wage Rate per Hour: \$31.60  
Supplemental Benefit Rate per Hour: \$24.02

(District Council of Painters)

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**PAINTER - STRUCTURAL STEEL**  
**(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)**

Painters - Structural Steel (First Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Painters - Structural Steel (Second Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Painters - Structural Steel (Third Year)

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #806)

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**PLASTERER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Plasterer - First Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyperson's rate  
Supplemental Rate Per Hour: \$12.76

Plasterer - First Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 45% of Journeyperson's rate  
Supplemental Rate Per Hour: \$13.24

Plasterer - Second Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 55% of Journeyperson's rate  
Supplemental Rate Per Hour: \$15.21

Plasterer - Second Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyperson's rate  
Supplemental Rate Per Hour: \$16.29

**Plasterer - Third Year: 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Rate Per Hour: \$18.46

**Plasterer - Third Year: 2nd Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Rate Per Hour: \$19.54

(Local #530)

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**PLUMBER**

**(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)**

**Plumber - First Year: 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$14.00  
Supplemental Benefit Rate per Hour: \$0.71

**Plumber - First Year: 2nd Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$14.00  
Supplemental Benefit Rate per Hour: \$2.96

**Plumber - Second Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$18.26  
Supplemental Benefit Rate per Hour: \$16.32

**Plumber - Third Year**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$20.36  
Supplemental Benefit Rate per Hour: \$16.32

**Plumber - Fourth Year**

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Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$23.21  
Supplemental Benefit Rate per Hour: \$16.32

Plumber - Fifth Year: 1st Six Months

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$24.61  
Supplemental Benefit Rate per Hour: \$16.32

Plumber - Fifth Year: 2nd Six Months

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$36.68  
Supplemental Benefit Rate per Hour: \$16.32

(Plumbers Local #1)

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**POINTER - WATERPROOFER, CAULKER MECHANIC (EXTERIOR BUILDING  
RENOVATION)**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Pointer - Waterproofer, Caulker Mechanic - First Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$25.00  
Supplemental Benefit Rate per Hour: \$3.64

Pointer - Waterproofer, Caulker Mechanic - Second Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$27.25  
Supplemental Benefit Rate per Hour: \$8.59

Pointer - Waterproofer, Caulker Mechanic - Third Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$32.23  
Supplemental Benefit Rate per Hour: \$11.34

Pointer - Waterproofer, Caulker Mechanic - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
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Wage Rate per Hour: \$38.66

Supplemental Benefit Rate per Hour: \$11.34

(Bricklayer District Council)

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## ROOFER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 2)

### Roofer - First Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 35% of Journeyman's Rate

### Roofer - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 50% of Journeyman's Rate

### Roofer - Third Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 60% of Journeyman's Rate

### Roofer - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 75% of Journeyman's Rate

(Local #8)

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## SHEET METAL WORKER

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 3)

### Sheet Metal Worker - First Year

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 30% of Journeyman's rate

Supplemental Rate Per Hour: \$15.37

### Sheet Metal Worker - Second Year

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Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 35% of Journeyperson's rate  
Supplemental Rate Per Hour: \$18.24

**Sheet Metal Worker - Third Year (1st Six Months)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyperson's rate  
Supplemental Rate Per Hour: \$20.06

**Sheet Metal Worker - Third Year (2nd Six Months)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 45% of Journeyperson's rate  
Supplemental Rate Per Hour: \$21.87

**Sheet Metal Worker - Fourth Year (1st Six Months)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Rate Per Hour: \$23.69

**Sheet Metal Worker - Fourth Year (2nd Six Months)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 55% of Journeyperson's rate  
Supplemental Rate Per Hour: \$25.33

**Sheet Metal Worker - Fifth Year (1st Six Months)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyperson's rate  
Supplemental Rate Per Hour: \$27.47

**Sheet Metal Worker - Fifth Year (2nd Six Months)**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Rate Per Hour: \$31.23

(Local #28)

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**SIGN ERECTOR**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

**Sign Erector - First Year: 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 35% of Journeyperson's rate  
Supplemental Rate Per Hour: \$5.96

**Sign Erector - First Year: 2nd Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyperson's rate  
Supplemental Rate Per Hour: \$6.75

**Sign Erector - Second Year: 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 45% of Journeyperson's rate  
Supplemental Rate Per Hour: \$7.55

**Sign Erector - Second Year: 2nd Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Rate Per Hour: \$8.34

**Sign Erector - Third Year: 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 55% of Journeyperson's rate  
Supplemental Rate Per Hour: \$9.13

**Sign Erector - Third Year: 2nd Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 60% of Journeyperson's rate  
Supplemental Rate Per Hour: \$9.92

**Sign Erector - Fourth Year: 1st Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Rate Per Hour: \$10.72

**Sign Erector - Fourth Year: 2nd Six Months**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 70% of Journeyperson's rate  
Supplemental Rate Per Hour: \$11.51

**Sign Erector - Fifth Year**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 75% of Journeyperson's rate  
Supplemental Rate Per Hour: \$12.30

Sign Erector - Sixth Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Rate Per Hour: \$12.30

(Local #137)

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**STEAMFITTER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 3)

Steamfitter - First Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate and Supplemental Per Hour: 40% of Journeyperson's rate

Steamfitter - Second Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate and Supplemental Rate Per Hour: 50% of Journeyperson's rate.

Steamfitter - Third Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate and Supplemental Rate per Hour: 65% of Journeyperson's rate.

Steamfitter - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate and Supplemental Rate Per Hour: 80% of Journeyperson's rate.

Steamfitter - Fifth Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate and Supplemental Rate Per Hour: 85% of Journeyperson's rate.

(Local #638)

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**STONE MASON - SETTER**

(Ratio Apprentice of Journeyman: 1 to 1, 1 to 2)

**Stone Mason - Setters - First 750 Hours**

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 50% of Journeyman's rate

**Stone Mason - Setters - Second 750 Hours**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 60% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

**Stone Mason - Setters - Third 750 Hours**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 70% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

**Stone Mason - Setters - Fourth 750 Hours**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 80% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

**Stone Mason - Setters - Fifth 750 Hours**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 90% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

**Stone Mason - Setters - Sixth 750 Hours**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate Per Hour: 100% of Journeyman's rate

Supplemental Rate Per Hour: 50% of Journeyman's rate

(Bricklayers District Council)

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**TAPER**

(Ratio of Apprentice to Journeyman: 1 to 1, 1 to 4)

**Drywall Taper - First Year**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 40% of Journeyperson's rate

Drywall Taper - Second Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 60% of Journeyperson's rate

Drywall Taper - Third Year

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 80% of Journeyperson's rate

(Local #1974)

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**TILE LAYER - SETTER**

(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 4)

Tile Layer - Setter - First 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 50% of Journeyperson's rate

Tile Layer - Setter - Second 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 55% of Journeyperson's rate

Tile Layer - Setter - Third 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 65% of Journeyperson's rate

Tile Layer - Setter - Fourth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 75% of Journeyperson's rate

Tile Layer - Setter - Fifth 750 Hours

Effective Period: 7/1/2013 - 6/30/2014

Wage and Supplemental Rate Per Hour: 85% of Journeyperson's rate

Tile Layer - Setter - Sixth 750 Hours

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§220 APPRENTICESHIP PREVAILING WAGE SCHEDULE

Effective Period: 7/1/2013 - 6/30/2014  
Wage and Supplemental Rate Per Hour: 95% of Journeyperson's rate

(Local #7)

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**TIMBERPERSON**  
(Ratio of Apprentice to Journeyperson: 1 to 1, 1 to 6)

Timberperson - First Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 40% of Journeyperson's rate  
Supplemental Rate Per Hour: \$30.04

Timberperson - Second Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 50% of Journeyperson's rate  
Supplemental Rate Per Hour: \$30.04

Timberperson - Third Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 65% of Journeyperson's rate  
Supplemental Rate Per Hour: \$30.04

Timberperson - Fourth Year

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate Per Hour: 80% of Journeyperson's rate  
Supplemental Rate Per Hour: \$30.04

(Local #1536)

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OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

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LABOR LAW § 230 AND NYC ADMINISTRATIVE CODE § 6-130  
BUILDING SERVICE EMPLOYEES

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PREVAILING WAGE FOR BUILDING SERVICE EMPLOYEES ON NYC CONTRACTS PURSUANT TO  
LABOR LAW § 230 ET SEQ.

Building service employees on public contracts must receive not less than the prevailing rate of wage and supplements for the classification of work performed. In accordance with Labor Law §230 et seq. the Comptroller of the City of New York has promulgated this schedule of prevailing wages and supplemental benefits for building service employees engaged on New York City public building service contracts in excess of \$1,500.00. Prevailing rates are required to be annexed to and form part of the contract pursuant to §231 (4).

Contracting agencies that anticipate doing work that may require building service trades or classifications not included in this schedule may request the Comptroller to establish a proper classification and wage determination for the work. Contractors using trades and/or classifications for which the Comptroller has not promulgated wages and benefits do so at their own risk.

Contractors are advised to review the applicable Comptroller's Prevailing Wage Schedule before bidding on public work. Any Prevailing Wage Rate error made by the Contracting Agency, whether in a contract document or other communication, will not preclude a finding against the contractor of a prevailing wage violation.

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PREVAILING WAGE FOR BUILDING SERVICE EMPLOYEES IN NEW YORK CITY LEASED OR  
FINANCIALLY ASSISTED FACILITIES PURSUANT TO NYC ADMINISTRATIVE CODE § 6-130

Covered landlords & covered financial assistance recipients shall ensure that all building service employees performing building service work at the premises to which a lease or financial assistance pertains are paid no less than the prevailing wage listed in the Labor Law §230 Prevailing Wage Schedule.

Covered Landlords include:

Businesses (other than not-for-profit organizations) leasing to New York City agencies commercial office space or commercial office facilities of 10,000 square feet or more where the City leases or rents no less than 51% of the total square footage of the building to which the lease applies (no less than 80% in Staten Island or in an area not defined as an exclusion area pursuant to section 421-a of the real property tax law on the date of enactment of the local law).

Covered Financial Assistance Recipients include:

Businesses (other than not-for-profit organizations) with annual gross revenues of five million dollars or more who have received financial assistance from the City of New York (as defined in New York City Administrative Code §6-130) with a total value of one million dollars or more.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Exemptions: Business Improvement Districts and employers with manufacturing operations at the premises to which the financial assistance pertains.

The information is intended to assist you in meeting your prevailing wage obligation. You should consult New York City Administrative Code §6-130 to determine whether you are covered by this prevailing wage law. New York City Administrative Code § 6-130 requires the City to maintain an updated list of covered landlords and financial assistance recipients who are subject to the prevailing wage requirement.

Labor Law § 231 (6) and NYC Administrative Law §6-130 require contractors to post on the site of the work a current copy of this schedule of wages and supplements.

This schedule is applicable to work performed during the effective period, unless otherwise noted. Changes to this schedule are published on our web site [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov). Contractors must pay the wages and supplements in effect when the building service employee performs the work. Preliminary schedules for future one-year periods appear in the City Record on or about June 1 each succeeding year. Final schedules appear on or about July 1 in the City Record and on our web site [www.comptroller.nyc.gov](http://www.comptroller.nyc.gov).

Contractors are solely responsible for maintaining original payroll records delineating, among other things, the hours worked by each employee within a given classification.

Some of the rates in this schedule are based on collective bargaining agreements. The Comptroller's Office has attempted to include all overtime, shift and night differential, Holiday, Saturday, Sunday or other premium time work. However, this schedule does not set forth every prevailing practice with respect to such rates with which employers must comply. All such practices are nevertheless part of the employer's prevailing wage obligation and contained in the collective bargaining agreements of the prevailing wage unions. These collective bargaining agreements are available for inspection by appointment. Requests for appointments may be made by calling (212) 669-4443, Monday through Friday between the hours of 9 a.m. and 5 p.m.

Answers to questions concerning prevailing trade practices may be obtained from the Classification Unit by calling (212) 669-7974. Please direct all other compliance issues to: Bureau of Labor Law, Attn: Wasył Kinach, P.E., Office of the Comptroller, 1 Centre Street, Room 1122, New York, N.Y. 10007; Fax (212) 669-4002.

In order to meet their obligation to provide prevailing supplemental benefits to each covered employee, employers must either:

- 1) Provide bona-fide benefits which cost the employer no less than the prevailing supplemental benefits rate; or
- 2) Supplement the employee's hourly wage by an amount no less than the prevailing supplemental benefits rate; or
- 3) Provide a combination of bona-fide benefits and wage supplements which cost the employer no less than the prevailing supplemental benefits rate in total.

Benefits are paid for EACH HOUR WORKED unless otherwise noted.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE



Office of the Comptroller  
BUREAU OF LABOR LAW

CITY OF NEW YORK  
OFFICE OF THE COMPTROLLER  
JOHN C. LIU

BUREAU OF LABOR LAW

MUNICIPAL BUILDING  
ONE CENTRE STREET, ROOM 1120  
NEW YORK, N.Y. 10007-2341

TEL: (212) 669-4443  
FAX: (212) 669-4002

If you are a Covered Building Service Employee and you have been paid less than the Prevailing Wage and Benefits, please contact us at 212-669-4443 or download our complaint form from our website at [WWW.COMPTROLLER.NYC.GOV](http://WWW.COMPTROLLER.NYC.GOV) (click on the Bureau of Labor Law).

Si es un empleado de servicios a edificios elegible y recibió menos del sueldo prevalente y beneficios, por favor contáctenos en 212-669-4443 o descarga un formulario de reclamo del sitio del Internet [WWW.COMPTROLLER.NYC.GOV](http://WWW.COMPTROLLER.NYC.GOV) (oprime "Oficina de Derecho Laboral").

Wasył Kinach, P.E.  
Director of Classifications  
Bureau of Labor Law

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

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## BOILER SERVICE PERSON/TANK CLEANER MECHANIC (LOW PRESSURE)

### Boiler Service Person/Tank Cleaner Mechanic (Low Pressure)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$11.37

Supplemental Benefit Rate per Hour: \$5.57

### Overtime Description

Work in excess of 8 hours performed on a Sunday or Holiday shall be paid two and one half times the regular rate.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Double time the regular rate for work on the following holiday(s).

### Paid Holidays

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Employee's Birthday

### Vacation

1 year service.....	five (5) days
3 years service or more.....	ten (10) days
8 years service or more.....	fifteen (15) days
13 years service or more.....	twenty (20) days

### SICK LEAVE:

1-2 years employment.....	4 days
2-3 years employment.....	5 days
3-4 years employment.....	6 days
4-5 years employment.....	8 days
6 years or more employment.....	10 days

(Local #32 B/J)

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## BUILDING CLEANER AND MAINTAINER (OFFICE)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Office Building Class "A" Handyman (Over 280,000 square feet gross area)**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$25.10

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$25.55

Supplemental Benefit Rate per Hour: \$9.91

**Office Building Class "A" Foreperson, Starter (Over 280,000 square feet gross area)**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$24.99

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$25.44

Supplemental Benefit Rate per Hour: \$9.91

**Office Building Class "A" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 280,000 square feet gross area)**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$22.97

Supplemental Benefit Rate per Hour: \$9.51

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment, the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$23.42

Supplemental Benefit Rate per Hour: \$9.91

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Office Building Class "B" Handyperson (Over 120,000 and less than 280,000 square feet gross area)**

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate per Hour: \$25.07  
Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate per Hour: \$25.52  
Supplemental Benefit Rate per Hour: \$9.91

**Office Building Class "B" Foreperson, Starter (Over 120,000 and less than 280,000 square feet gross area)**

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate per Hour: \$24.95  
Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate per Hour: \$25.40  
Supplemental Benefit Rate per Hour: \$9.91

**Office Building Class "B" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Over 120,000 and less than 280,000 square feet gross area)**

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate per Hour: \$22.94  
Supplemental Benefit Rate per Hour: \$9.51  
Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate per Hour: \$23.39  
Supplemental Benefit Rate per Hour: \$9.91  
Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Office Building Class "C" Handyman (Less than 120,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate per Hour: \$25.02  
Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate per Hour: \$25.47  
Supplemental Benefit Rate per Hour: \$9.91

Office Building Class "C" Foreperson, Starter (Less than 120,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate per Hour: \$24.91  
Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate per Hour: \$25.36  
Supplemental Benefit Rate per Hour: \$9.91

Office Building Class "C" Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director (Less than 120,000 square feet gross area)

Effective Period: 7/1/2013 - 12/31/2013  
Wage Rate per Hour: \$22.90  
Supplemental Benefit Rate per Hour: \$9.51  
Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014  
Wage Rate per Hour: \$23.35  
Supplemental Benefit Rate per Hour: \$9.91  
Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Cleaner/Porter, Elevator Operator, Exterminator, Fire Safety Director may be paid 75% of the wage rate above for the first 21 months of employment, 85% of the wage rate above for the 22nd through 42nd months of employment, and upon the completion of 42 months of employment employee shall be paid the full wage rate. Note: New Hires hired before January 1, 2012 will continue to receive 80% of the wage rate above for the first 30 months, and upon the completion of 30 months of employment employee shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Overtime**

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for work on a holiday plus the day's pay.  
Time and one-half the regular hourly rate after 40 hours in any work week.

**Paid Holidays**

New Year's Day  
President's Day  
Good Friday  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Thanksgiving Day  
Day after Thanksgiving  
Christmas Day

**Vacation**

Less than 6 months of work.....no vacation  
6 months of work.....three (3) days  
1 year of work.....ten (10) days  
5 years of work.....fifteen (15) days  
15 years of work.....twenty (20) days  
21 years of work.....twenty-one (21) days  
22 years of work.....twenty-two (22) days  
23 years of work.....twenty-three (23) days  
24 years of work.....twenty-four (24) days  
25 years or more of work.....twenty-five (25) days  
Plus two Personal Days per year.

**Sick Leave:**

10 sick days per year.  
Unused sick leave paid in the succeeding January, one full day pay for each unused sick day.

(Local #32 B/J)

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**BUILDING CLEANER AND MAINTAINER (RESIDENTIAL)**

**Residential Building Class "A" Handyman**

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$23.57  
Supplemental Benefit Rate per Hour: \$9.43  
Supplemental Note: Effective 1/1/2014 - \$9.83

**Residential Building Class "A" Cleaner/Porter**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230. PREVAILING WAGE SCHEDULE

Residential Buildings Class "A": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$4000.00 a room.

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$21.34

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$21.34

Supplemental Benefit Rate per Hour: \$9.83

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

**Residential Building Class "B" Handyperson**

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.51

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: Effective 1/1/2014 - \$9.83

**Residential Building Class "B" Cleaner/Porter**

Residential Building Class "B": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of over \$2000.00 a room and not over \$4000.00 a room.

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$21.28

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Wage Rate per Hour: \$21.28

Supplemental Benefit Rate per Hour: \$9.83

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

### Residential Building Class "C" Handyperson

Residential Building Class "C": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$23.45

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: Effective 1/1/2014 - \$9.83

### Residential Building Class "C" Cleaner/Porter

Residential Building Class "C": buildings where the assessed value of the land and building, based upon the 1935 assessment, divided by the number of rooms in the building, gives an assessed value of \$2000.00 or less a room.

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$21.23

Supplemental Benefit Rate per Hour: \$9.43

Supplemental Note: for new employee 0-12 months of employment - \$6.92; for new employee 13-24 months of employment - \$9.18

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$21.23

Supplemental Benefit Rate per Hour: \$9.83

Supplemental Note: for new employee 0-12 months of employment - \$7.22; for new employee 13-24 months of employment - \$9.58

NEW HIRE: Porter/Cleaner, may be paid a starting rate of 80% of the hourly rate published above. Upon completion of 30 months of employment, the new hire shall be paid the full wage rate. Upon completion of two years of employment the new hire receives the full supplemental benefit rate.

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for work on a holiday plus the day's pay.

Time and one half the regular hourly rate after 40 hours in any work week.

### Paid Holidays

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

New Year's Day  
Martin Luther King Jr. Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Columbus Day  
Election Day  
Thanksgiving Day  
Christmas Day

**Vacation**

6 months.....three (3) days  
1 year.....ten (10) days  
5 years.....fifteen (15) days  
15 years.....twenty (20) days  
21 years.....twenty-one (21) days  
22 years.....twenty-two (22) days  
23 years.....twenty-three (23) days  
24 years.....twenty-four (24) days  
25 years.....twenty-five (25) days  
Plus two Personal Days per year.

**SICK LEAVE**

After 1 year of service.....ten (10) days per year

(Local #32 B/J)

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**BUILDING HVAC SERVICES OPERATOR**

**Engineer (Refrigeration)**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$35.18**

Supplemental Benefit Rate per Hour: **\$15.78**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$36.73**

Supplemental Benefit Rate per Hour: **\$16.35**

**Fireperson**

Fireperson (Helper): Assist the Engineer

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: **\$27.39**

Supplemental Benefit Rate per Hour: **\$15.41**

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: **\$28.60**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Supplemental Benefit Rate per Hour: \$15.97

**Overtime Description**

All hours worked on a holiday shall be paid at two and one half times the regular wage rate in lieu of the paid day off.

**Overtime**

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular rate for Saturday.  
Time and one half the regular rate for Sunday.

**Paid Holidays**

New Year's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day  
Plus six (6) floating Holidays

**Vacation**

6 months .....	three (3) days
1 year .....	ten (10) days
5 years .....	fifteen (15) days
15 years .....	twenty (20) days
21 years.....	twenty-one (21) days
22 years .....	twenty-two (22) days
23 years .....	twenty-three (23) days
24 years .....	twenty-four (24) days
25 years .....	twenty-five (25) days

(Local #94)

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**CLEANER (PARKING GARAGE)**

**Garage Cleaner**

Effective Period: 7/1/2013 - 6/30/2014  
Wage Rate per Hour: \$11.20  
Supplemental Benefit Rate per Hour: \$1.72

**Overtime**

Time and one half the regular rate after an 8 hour day.  
Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**FUEL OIL**

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (5th Year and above)**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$30.61

Supplemental Benefit Rate per Hour: \$20.42

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (4th Year)**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$28.00

Supplemental Benefit Rate per Hour: \$20.42

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (3rd Year)**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$26.00

Supplemental Benefit Rate per Hour: \$20.42

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (2nd Year)**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$24.00

Supplemental Benefit Rate per Hour: \$20.42

**Fuel Oil, Coal, Fuel Gas, Petroleum Product Chauffeur (1st Year)**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$22.00

Supplemental Benefit Rate per Hour: \$20.42

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

**Overtime Holidays**

Double time the regular rate for work on the following holiday(s).

Martin Luther King Jr. Day

Lincoln's Birthday

Washington's Birthday

Memorial Day

Independence Day

Labor Day

Columbus Day

Election Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Veteran's Day**

Triple time the regular rate for work on the following holiday(s).

- New Year's Day
- Thanksgiving Day
- Christmas Day

**Paid Holidays**

- New Year's Day
- Martin Luther King Jr. Day
- Lincoln's Birthday
- Washington's Birthday
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Election Day
- Veteran's Day
- Thanksgiving Day
- Christmas Day

**Vacation**

- Less than 75 days worked.....no vacation.
- 75 days worked, but less than 110 days worked in a calendar year.....five (5) days the following year.
- 110 days or more worked in a calendar year.....ten (10) days the following year.

**SICK LEAVE:**

1 day sick leave earned for each 40 days worked in the preceding calendar year for a maximum of five (5) days per calendar year.

(Local #553)

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**GARDENER**

**Gardener**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$17.16

Supplemental Benefit Rate per Hour: \$1.72

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
\$230 PREVAILING WAGE SCHEDULE

## LOCKSMITH

### Locksmith

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$19.63

Supplemental Benefit Rate per Hour: \$6.20

### Overtime

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

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## MEDICAL WASTE REMOVAL

### Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$18.00

Supplemental Benefit Rate per Hour: \$9.34

### Helper

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$14.25

Supplemental Benefit Rate per Hour: \$9.34

### Tractor Trailer Driver

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$20.50

Supplemental Benefit Rate per Hour: \$9.34

### Overtime Description

Time and one half the regular hourly rate after an 8 hour day or after 40 hours in any work week. The seventh day of work in a workweek is paid at double time the regular hourly rate. Time and one-half the regular hourly rate for work on a holiday plus days pay for below paid holidays.

### Paid Holidays

President's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Christmas Day

**Vacation**

1 year of service but less than five years.....	ten (10) days
5 years of service but less than ten years.....	fifteen (15) days
10 years of service.....	sixteen (16) days
11 years.....	seventeen (17) days
12 years.....	eighteen (18) days
13 years.....	nineteen (19) days
14 years.....	twenty (20) days
20 years.....	twenty-one (21) days
21 years.....	twenty-two (22) days
22 years.....	twenty-three (23) days
23 years.....	twenty-four (24) days
24 years.....	twenty-five (25) days
Plus 5 Personal Days	

(Local #813)

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**MOVER - OFFICE FURNITURE AND EQUIPMENT**

**Heavy and Tractor Trailer Truck Driver**

Tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW)

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$22.57

Supplemental Benefit Rate per Hour: \$4.49

**Light Truck Driver**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$19.81

Supplemental Benefit Rate per Hour: \$4.49

**Laborer and Freight, Stock, and Material Movers, Hand**

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$17.51

Supplemental Benefit Rate per Hour: \$4.49

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

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**REFUSE REMOVER**

Refuse Remover

Effective Period: 7/1/2013 - 6/30/2014

Wage Rate per Hour: \$29.27

Supplemental Benefit Rate per Hour: \$4.49

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

(Based on data from NYS Department of Labor Occupational Employment Statistics and US Department of Labor Bureau of Labor Statistics)

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**SECURITY GUARD (ARMED)**

Security Guard (Armed)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$28.00

Supplemental Benefit Rate per Hour: \$4.90

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43; for new employee 121 days - 2 years of employment - \$4.54

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$28.25

Supplemental Benefit Rate per Hour: \$5.02

Supplemental Note: for new employee 0-30 days of employment - \$4.44; for new employee 31-120 days of employment - \$4.61; for new employee 121 days - 2 years of employment - \$4.63

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

**Overtime Description**

A guard who works a holiday is paid the regular rate plus receives the paid holiday.

Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

**Overtime**

Time and one half the regular rate after an 8 hour day.

Time and one half the regular hourly rate after 40 hours in any work week.

**Paid Holidays**

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

New Year's Day  
President's Day  
Memorial Day  
Independence Day  
Labor Day  
Thanksgiving Day  
Christmas Day  
Personal Day

### Vacation

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

### Sick Leave

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

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## SECURITY GUARD (UNARMED)

### Security Guard (Unarmed) 0 - 6 months

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$12.85

Supplemental Benefit Rate per Hour: \$4.54

Supplemental Note: for new employee 0-30 days of employment - \$4.26; for new employee 31-120 days of employment - \$4.43

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$13.10

Supplemental Benefit Rate per Hour: \$4.63

Supplemental Note: for new employee 0-30 days of employment - \$4.44; for new employee 31-120 days of employment - \$4.61

### Security Guard (Unarmed) 7 - 12 months

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$13.35

Supplemental Benefit Rate per Hour: \$4.54

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$13.60

Supplemental Benefit Rate per Hour: \$4.63

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

**Security Guard (Unarmed) 13 - 18 months**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$13.85

Supplemental Benefit Rate per Hour: \$4.54

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$14.10

Supplemental Benefit Rate per Hour: \$4.63

**Security Guard (Unarmed) 19 - 24 months**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$14.35

Supplemental Benefit Rate per Hour: \$4.54

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$14.60

Supplemental Benefit Rate per Hour: \$4.63

**Security Guard (Unarmed) 25 - 30 months**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$14.85

Supplemental Benefit Rate per Hour: \$4.90

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$15.10

Supplemental Benefit Rate per Hour: \$5.02

**Security Guard (Unarmed) 31 months or more**

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$15.15

Supplemental Benefit Rate per Hour: \$4.90

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$15.60

Supplemental Benefit Rate per Hour: \$5.02

Months of employment shall be defined as an Employee's length of service with the Employer or at the Facility, whichever is greater.

**Overtime Description**

A guard who works a holiday is paid the regular rate plus receives the paid holiday.  
Supplemental Benefits shall be paid for each hour paid, up to forty (40) paid hours per week.

**Overtime**

Time and one half the regular rate after an 8 hour day.

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Time and one half the regular hourly rate after 40 hours in any work week.

**Paid Holidays**

- New Year's Day
- President's Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Christmas Day
- Personal Day

**Vacation**

Months on payroll	Vacation with Pay
6	3 days
12	5 days
24	10 days
60	15 days
180	20 days
300	25 days

**Sick Leave**

Employees accrue paid sick leave at the rate of one (1) sick day for every six (6) months worked, up to a maximum of six (6) days a year.

(Local #32B/J)

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**WINDOW CLEANER**

Window Cleaner

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$26.44

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$26.90

Supplemental Benefit Rate per Hour: \$9.91

Power Operated Scaffolds, Manual Scaffolds, and Boatswain Chairs

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$28.69

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$29.27

Supplemental Benefit Rate per Hour: \$9.91

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Window Cleaner Apprentice (0 - 3 months)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$19.59

Supplemental Benefit Rate per Hour: None

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$19.92

Supplemental Benefit Rate per Hour: None

Window Cleaner Apprentice (4 - 7 months)

Employee must be a registered apprentice with the New York State Department of Labor

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$21.18

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$21.54

Supplemental Benefit Rate per Hour: \$9.91

Window Cleaner Apprentice (8 - 11 months)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$22.44

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$22.82

Supplemental Benefit Rate per Hour: \$9.91

Window Cleaner Apprentice (12 - 15 months)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$23.72

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

Wage Rate per Hour: \$24.12

Supplemental Benefit Rate per Hour: \$9.91

Window Cleaner Apprentice (16 - 17 months)

Effective Period: 7/1/2013 - 12/31/2013

Wage Rate per Hour: \$25.01

Supplemental Benefit Rate per Hour: \$9.51

Effective Period: 1/1/2014 - 6/30/2014

OFFICE OF THE COMPTROLLER, CITY OF NEW YORK  
§230 PREVAILING WAGE SCHEDULE

Base Rate per Hour: \$25.44

Supplemental Benefit Rate per Hour: \$9.91

### Overtime

Time and one half the regular rate after an 8-hour day.

Time and one half the regular rate for Saturday.

Double time the regular rate for Sunday.

Time and one half the regular rate for work on a holiday plus the day's pay.

### Paid Holidays

New Year's Day

Martin Luther King Jr. Day

President's Day

Good Friday

Memorial Day

Independence Day

Labor Day

Columbus Day

Thanksgiving Day

Day after Thanksgiving

Christmas Day

Personal Day

### Vacation

After 7 months but less than 1 year of service.....five (5) days

1 year but less than 5 years of service.....ten (10) days

5 years of service but less than 15 years of service.....fifteen (15) days

15 years of service but less than 21 years of service.....twenty (20) days

21 years.....twenty-one (21) days

22 years.....twenty-two (22) days

23 years.....twenty-three (23) days

24 years.....twenty-four (24) days

25 years or more of service.....twenty-five (25) days

Plus 1 day per year for medical visit

### SICK LEAVE:

10 days after one year worked. Unused sick days to be paid in cash.

(Local #32 B/J)

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THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF STRUCTURES

ADDENDUM TO THE GENERAL CONDITIONS

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The General Conditions are hereby amended in accordance  
with the terms and conditions set forth in this Addendum.

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I. PROJECT DESCRIPTION

FMS #: **LNEMA08WS**

PROJECT NAME: **Woodstock Branch Library Renovation and ADA Compliance**

PROJECT DESCRIPTION: This Project consists of the full renovation of the first and second floor of this historic branch library designed by McKim, Mead and White, as well as two necessary measures to make the library accessible: the insertion of a new elevator and the replacement of an enclosed egress stair with a new open stair. The project scope includes new lighting in the renovated areas, a new sprinkler system for the cellar and around the open stair, improvements to the fire alarm system, ADA compliance, including the installation of an elevator, and upgrades to the building infrastructure and security systems.

PROJECT LOCATION: **761 East 160<sup>th</sup> Street**  
BOROUGH: **Bronx**  
CITY OF NEW YORK  
ZIP CODE: **10465**  
COMMUNITY BOARD #: **1**

PROJECT MANAGEMENT:

- DDC shall publicly bid and enter into a single Contract for the Project. DDC shall manage the Project using its own personnel.
- DDC shall publicly bid and enter into a single Contract for the Project. A Construction Management firm (the "CM") hired by DDC shall manage the Project. The Contractor is advised that the CM shall serve as the representative of the Commissioner at the site and shall, subject to review by the Commissioner, be responsible for the inspection, management, coordination and administration of the required construction work, as delineated in the article of the Standard Construction Contract (September 2008) entitled "The Resident Engineer".
- DDC has entered into CM/Build Contract for the Project. The CM/Build Contractor shall be responsible for conducting a competitive bid process and entering into the contract(s) for the Project.

II. CM / BUILD CONTRACT: REVISIONS TO THE GENERAL CONDITIONS

Not used.

### III. CONTRACTS FOR THE PROJECT

The Project consists of a single contract, the Contract for General Construction Work. The Contractor for General Construction Work is responsible for the performance of all required work for the Project as set forth in the Contract Documents (General Conditions, Drawings and Specifications), including all responsibilities and obligations assigned to separate Contractors for the following subdivisions of the work: Plumbing Work, HVAC Work, and Electrical Work. All responsibilities and obligations in the Contract Documents assigned to separate Contractors for such subdivisions of the work are the responsibility of the Contractor for General Construction Work.

### IV. SCHEDULES

The Contractor is advised that Schedules A through F are attached to, and incorporated as part of, this Addendum to the General Conditions. These schedules contain important information that is specific to this Project. The Contractor is advised to carefully review these schedules.

### V. APPLICABILITY OF ARTICLES AND AMENDED ARTICLES

The Contractor is advised that various Articles in the General Conditions may not apply to this Project or may apply as amended. Such Articles advise the Contractor to "Refer to the Addendum to the General Conditions for the applicability of this Article." Such Articles are set forth below. A check mark indicates whether the Article (1) applies to the Project, (2) does not apply to the Project, or (3) applies to the Project as amended. If no box is checked, the Article, as set forth in the General Conditions, applies to the Project. Amended Articles, if any, are set forth following this list of Articles.

<u>Article No.</u>	<u>Article</u>	<u>Sub-Article or PART</u> (if applicable)	Applies	Does not Apply	Applies as Amended
1.04	Contract Drawings	C ) PRINTS	x		
1.05	Shop Drawings and Record Drawings	B ) INTEGRATED DRAWINGS	x		
1.09	Surveys			x	
1.13	Sleeves and Hangers		x		
1.15	Temporary Heat		x		
1.20	Progress Photographs		x		
1.26	Security Guards/Fire Guards on the Site			x	
1.29	Sleeve and Penetration Drawings		x		
1.30	Location of Partitions		x		
1.34	Temporary Services	PART A		x	
		PART B			x
1.35	Temporary Use, Operation and Maintenance of Elevators during Construction	PART A – For New Buildings Up to 15 Stories		x	
		PART B – For New Buildings Over 15 Stories		x	
		PART C – Existing Buildings		x	

<u>Article No.</u>	<u>Article</u>	<u>Sub-Article or PART</u> (if applicable)	<u>Applies</u>	<u>Does not Apply</u>	<u>Applies as Amended</u>
1.36	General Mechanical Requirements		x		
1.37	General Electrical Requirements	PART B – Section A) Temporary Lighting	x		
		PART B – Section B) Site Security Lighting (New Construction)		x	
		PART D – Electrical Conduit System Including Boxes	x		
		PART E – Electrical Wiring Devices	x		
		PART F – Electrical Conductors and Terminators	x		
		PART G – Circuit Protective Devices	x		
		PART H – Distribution Centers	x		
		PART I – Motors	x		
		PART J – Motor Control Equipment	x		
1.40	Separation Between Trades			x	
1.42	Specific Requirements	C ) BORINGS		x	
		E ) WORK FENCE ENCLOSURE		x	
		G ) RESIDENT ENGINEER'S OFFICE			
		1. OFFICE SPACE IN EXISTING BUILDING			x
		2. TRAILER OFFICE		x	
		H ) ADDITIONAL EQUIPMENT FOR THE RESIDENT ENGINEER			x
		I ) PUBLIC TELEPHONE	x		
		Q ) PROJECT SIGN AND RENDERING			
		PART B – PROJECT RENDERING		x	

### COMPUTER WORKSTATIONS

H) Number of Computer Workstations to be provided as outlined in Article 1.42 H, item 4:

## AMENDED ARTICLES

The Contractor is advised that the amended Articles set forth below are included in the General Conditions and apply to the Project.

### Amended Article 1.34/Part B of the General Conditions:

- A. WATER: Water will be available at no cost at the facility during construction.
- B. ELECTRICITY: Electricity for temporary light and the operation of small tools will be available at no cost at the facility during construction.
- C. TOILET FACILITIES: Applies as stated in the General Conditions.
- D. MAINTENANCE: Applies as stated in the General Conditions.
- E. NUISANCES: Applies as stated in the General Conditions.

### Amended Article 1.42/G-1 of the General Conditions:

- a. Article 1.42/G item 1.a. applies as stated in General Conditions
- b. Article 1.42/G item 1.b. applies as stated in General Conditions
- c. Article 1.42/G items 1.c.(1) thru (5) applies as stated in General Conditions

Additional equipment in Article 1.42/G, item 1c.as follows:

- (6) Drafting table
- (7) Two gang boxes, medium sized, with keyed-alike pad locks.
- (8) Two folding tables, 72" long.
- (9) Ten folding chairs
- (10) Wireless printer/scanner/fax/telephone
- (11) Running water closet and wash basin (lav)

### Amended Article 1.42/H of the General Conditions:

- 1. One digital camera
- 2. One copy machine for paper size 8 1/2x11, 8 1/2x14, and 11x17
- 3. Article 1.42 H, item 3, applies as stated in the General Conditions
- 4. Lap Top computer with wireless router and high speed internet access

## VI. ADDITIONAL ARTICLES

NOT USED

## VII. SPECIAL EXPERIENCE REQUIREMENTS FOR THE PROJECT

- (1) **GENERAL:** The following are set forth below: (a) Special Experience Requirements applicable to the contractor or subcontractor that will perform specific areas of work, and (b) Special Experience Requirements applicable to the manufacturer that will provide specific material or equipment.
- (2) **REVISION OF SPECIFICATIONS AND DRAWINGS:** In the event the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth below, such Special Experience Requirement is deemed deleted, except as otherwise expressly provided in Section VIII of this Addendum.
- (3) **SPECIAL EXPERIENCE REQUIREMENTS FOR SPECIFIC AREAS OF WORK:** The special experience requirements set forth below apply to the contractor or subcontractor that will perform specific areas of work. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of such award, the contractor will be required to submit the qualifications of the contractor or subcontractor that will perform these specific areas of work. If the contractor intends to perform these specific areas of work with its own forces, it must demonstrate compliance with the special experience requirements. If the contractor intends to subcontract these specific areas of work, the proposed subcontractor(s) must demonstrate compliance with the special experience requirements. Once approved, no substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City.
  - (a) **Special Experience Requirement #1:** The contractor or subcontractor performing the work of this section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work. This Special Experience Requirement applies to the contractor or subcontractor that will perform specific areas of work specified in the sections set forth below.

### General Construction Work:

- (1) Section 03 30 00: Cast-In-Place Concrete
- (2) Section 03 33 00: Architectural Cast-In-Place Concrete
- (3) Section 05 12 00: Structural Steel
- (4) Section 05 50 00: Miscellaneous Metals
- (5) Section 05 70 10: Ornamental Glass Rail Systems
- (6) Section 05 71 00: Decorative Metal Stairs
- (7) Section 06 40 23: Architectural Woodwork
- (8) Section 08 42 28: All Glass Doors and Partitions
- (9) Section 09 64 00: Wood Strip Flooring

- (b) **Special Experience Requirement #2:** The contractor or subcontractor performing the work of this section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work. In addition, the contractor or subcontractor must be certified, licensed or approved by the manufacturer of the roofing system. This Special Experience Requirement applies to the contractor or subcontractor that will perform specific areas of work specified in the sections set forth below.

### General Construction Work:

- (1) Section 07 55 00: Modified Bitumen Roofing

- (c) **Special Experience Requirement #3:** The contractor or subcontractor performing the work of this section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work. Such prior projects must have involved facilities determined by the City to be of landmark quality and/or historical significance. This Special Experience Requirement applies to the contractor or subcontractor that will perform specific areas of work specified in the sections set forth below.

### General Construction Work:

- (1) Section 04 01 00: Masonry Restoration and Cleaning

(2) Section 09 01 20: Plaster Restoration

(4) **SPECIAL EXPERIENCE REQUIREMENTS FOR MANUFACTURERS**: The special experience requirements set forth below apply to the manufacturer that will supply or fabricate specific material or equipment. Compliance with such experience requirements will be evaluated after an award of contract. Within two (2) weeks of award, the contractor will be required to submit the qualifications of the proposed manufacturer(s). Once approved, no substitution will be permitted, unless the qualifications of the proposed replacement have been approved in writing in advance by the City

(a) Special Experience Requirement #4: The manufacturer providing the material or equipment specified in this section must, for the past five (5) years, have been regularly engaged in the manufacture of material or equipment similar in type to that required for this Project. Such similar material or equipment provided by the manufacturer must have been in satisfactory service for not less than five (5) years. This Special Experience Requirement applies to the manufacturer that will provide material or equipment specified in the section(s) set forth below.

**General Construction Work:**

- (1) Section 05 70 10: Ornamental Glass Rail Systems
- (2) Section 08 80 00: Glass and Glazing

## VIII. REVISIONS: SPECIFICATIONS AND CONTRACT DRAWINGS

The Specifications and the Contract Drawings for the Project are revised in accordance with the provisions set forth below.

- (1) Owner: Wherever the term "Owner" is used in the Specifications and/or the Contract Drawings, such term shall mean the City of New York.
- (2) Other Entities: In the event any entity other than the City of New York is referred to or named as the "Owner" in the Specifications and/or the Contract Drawings, the name of such other entity is deemed deleted and replaced with the "City of New York".
- (3) Architect / Engineer: Wherever the words "Architect", "Engineer", "Architect / Engineer" or "Architect and/or Engineer" are used in the Specifications and/or the Contract Drawings, such words are deemed deleted and replaced with the word "Commissioner".
- (4) Products / Manufacturers: Wherever the Specifications and/or the Contract Drawings require the contractor to provide a particular product (i.e., material and/or equipment) from a designated manufacturer and/or vendor, the term "or approved equal" is deemed inserted, even if only one product and/or manufacturer is specified, except as otherwise provided below.
  - (a) Proprietary Items: If the Bid Booklet contains a Notice which identifies a particular product from a designated manufacturer as a "Proprietary Item", the Contractor shall be required to provide such specified product. In such case, no substitution or "approved equal" will be permitted.
- (5) Special Experience Requirements: Special Experience Requirements for the Project, if any, are set forth in the Bid Booklet. Special Experience Requirements may apply to contractors, subcontractors, installers, manufacturers and/or suppliers. If the Specifications and/or the Contract Drawings contain any Special Experience Requirement that is not set forth in the Bid Booklet, such Special Experience Requirement is deemed deleted, except as otherwise provided below.
  - (a) Any Special Experience Requirement that provides that the entity performing the work or supplying the material must have more than three (3) years of experience, is revised to provide that the entity performing the work or supplying the material must have three (3) years of experience, except as described in paragraph (b) below.
  - (b) Any Special Experience Requirement that pertains to the abatement of hazardous materials shall not be subject to the deletion and/or revision set forth above. Such Special Experience Requirement shall remain in full force and effect.
  - (c) Any Special Experience Requirement that provides that the entity performing the work must be licensed, authorized, certified, approved by or acceptable to the manufacturer, is deemed deleted and replaced with the requirement that such entity must be properly trained for the specified work.
  - (d) Any Special Experience Requirement that provides that the individual workers performing the work must be licensed, authorized, certified, approved by or acceptable to the manufacturer, is deemed deleted and replaced with the requirement that such individual workers must be properly trained for the specified work.
- (6) Alternate Bids: If the agency is requesting the submission of Alternate Bids, a Notice regarding such Alternate Bids is set forth in the Bid Booklet. In the event of any conflict or inconsistency between (1) the Notice regarding Alternate Bids set forth in the Bid Booklet and (2) a provision in the Specifications and/or the Contract Drawings regarding Alternate Bids, the Notice set forth in the Bid Booklet shall prevail. If the agency is not requesting the submission of Alternate Bids, as indicated by the absence of a Notice in the Bid Booklet, and the Specifications and/or the Contract Drawings contain any provision regarding Alternate Bids, such provision is deemed deleted.
- (7) Contractor Retained Engineer: If the Specifications and/or the Contract Drawings require the Contractor to retain an Engineer to provide engineering services for the Project, the following sentence is deemed inserted: "Such Engineer must be a Professional Engineer, licensed in the State of New York."

- (8) LEED Related Provisions: If the Specifications and/or the Contract Drawings require the Contractor to purchase FSC certified wood, rapidly renewable materials, or materials within 500 miles, such provisions are deemed deleted and replaced with the requirement that if the contractor has purchased FSC certified wood, rapidly renewable materials, or materials within 500 miles, the contractor shall submit such forms or documentation as may be required by the City in order for the USGBC to certify that the Project qualifies for the related LEED credit(s).
- (9) Guarantees: Requirements for Guarantees and Maintenance are set forth in Schedule B, which is included in the Addendum to the General Conditions. In the event of any conflict or inconsistency between (1) a guarantee and/or maintenance requirement set forth in the Specifications and/or the Contract Drawings and (2) a guarantee and/or maintenance requirement set forth in Schedule B, the guarantee and/or maintenance requirement set forth in Schedule B shall prevail.
- (10) Warranties: Requirements for Warranties are set forth in Schedule B, which is included in the Addendum to the General Conditions.
- (a) In the event of any conflict or inconsistency between (1) a warranty requirement set forth in the Specifications and/or the Contract Drawings and (2) a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall prevail.
- (b) In the event a warranty requirement set forth in the Specifications and/or the Contract Drawings is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor's obligation to provide the manufacturer's warranty, as set forth in the Specifications and/or the Contract Drawings, shall remain in full force and effect.
- (c) In the event a warranty requirement for a particular item of material or equipment is omitted from Schedule B, as well as from the Specifications or the Contract Drawings, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.
- (11) Exculpatory Provisions: In the event the Specifications and/or the Contract Drawings contain any provision whereby the consultant and/or any of its officers, employees or agents, including subconsultants, is absolved of responsibility for any act or omission, such provision is deemed deleted.
- (12) Insurance: Provisions regarding insurance coverage the Contractor is required to provide are set forth in Article 22 of the City of New York Standard Construction Contract and Schedule A, which is included in the Addendum to the General Conditions. In the event the Specifications and/or the Contract Drawings contain any provision regarding insurance requirements, such provision is deemed deleted.
- (13) Indemnification: Provisions regarding indemnification are set forth in Articles 7, 12, 22 and 57 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding indemnification, such provision is deemed deleted.
- (14) Dispute Resolution: Provisions regarding dispute resolution are set forth in Article 27 of the City of New York Standard Construction Contract. In the event the Specifications and/or the Contract Drawings contain any provision regarding dispute resolution, such provision is deemed deleted.
- (15) Payment to Other Entities: In the event the Specifications and/or the Contract Drawings contain any provision which requires the Contractor to make payments to an entity other than a subcontractor and/or supplier providing services and/or material for the project, such provision is deemed deleted.
- (16) General Conditions: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the General Conditions, the General Conditions shall prevail.
- (17) Standard Construction Contract: In the event of any conflict or inconsistency between (1) the Specifications and/or the Contract Drawings and (2) the City of New York Standard Construction Contract, the City of New York Standard Construction Contract shall prevail.

**SCHEDULE A (FOR PUBLICLY BID PROJECTS)**  
**Contract Requirements**

Various Articles of the Contract refer to requirements which are set forth in Schedule A of the General Conditions. The Schedule set forth below specifies the following: (1) the referenced Articles of the Contract, and (2) the specific requirements applicable to the contract.

REFERENCE	ITEM	REQUIREMENTS	CONTRACT FOR GENERAL CONSTRUCTION	
Article 14 Contract	Time of Completion	Consecutive Calendar Days	630 ccds	
Article 15 Contract	Liquidated Damages	For each consecutive calendar day over completion time	<b>\$ 600</b>	
Article 17 Contract	Sub- contracts	Not to exceed percent of Contract Price	<b>60%</b>	
Article 21 Contract	Retainage	Percent of voucher	If 100% bonds are required	<b>5%</b>
			If 100% bonds are not required, and Contract Price is less than \$500,000	<b>10%</b>
			If 100% bonds are not required, and Contract Price is more than \$500,000	<b>10%</b>
Article 24 Contract	Maintenance & Guaranty	Percent of Contract Price	<b>1%</b>	
Article 77 Contract	MWBE Program		See Subcontractor Utilization Plan in the Bid Booklet	

**SCHEDULE A (FOR PUBLICLY BID PROJECTS)**

**Relating to Article 22 - Insurance**

**PART I. Minimum Limits and Special Conditions**

Insurance indicated by a blackened box (■) or by (X) in the  to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
<p>■ Commercial General Liability      Art. 22.1.1</p>	<p>\$ 1,000,000 per occurrence \$ 2,000,000 aggregate (applicable separately to this Project)</p> <p>Additional Insureds: 1. City of New York, including its officials and employees, and 2. The New York Public Library, including its officials and employees.</p>
<p>■ Workers' Compensation              Art. 22.1.2</p> <p>■ Disability Benefits Insurance        Art. 22.1.2</p> <p>■ Employers' Liability                    Art. 22.1.3</p> <p><input type="checkbox"/> Jones Act                                  Art. 22.1.4</p> <p><input type="checkbox"/> U.S. Longshoremen's and Harbor Workers Compensation Act      Art. 22.1.4</p>	<p>Workers' Compensation: Statutory per New York State law without regard to jurisdiction</p> <p>Disability Benefits Insurance: Statutory per New York State law without regard to jurisdiction</p> <p>Employers' Liability: \$1,000,000 each accident</p>
<p>■ Builders' Risk                            Art 22.1.5</p> <p><input type="checkbox"/> Installation Floater</p>	<p>Applicable to Builders' Risk or Installation Floater:</p> <p align="center"><u>100</u> % of total value of <b>Work</b></p> <p>City of New York and the <b>Contractor</b> named as Loss Payee for the <b>Work</b> in order of precedence, as their interests may appear.</p> <p><u>Note:</u> Article 22.1.5 is revised by deleting the following sentence: "Such policy shall name as insureds the City, the Contractor, and its Subcontractors". This deletion applies to Builders' Risk and Installation Floater.</p>

**SCHEDULE A (FOR PUBLICLY BID PROJECTS)**

**Relating to Article 22 - Insurance**

**PART I. Minimum Limits and Special Conditions (Continued)**

Insurance indicated by a blackened box (■) or by (X) in the  to left will be required under this contract.

Types of Insurance (per Article 22 in its entirety, including listed paragraph)	Minimum Limits and Special Conditions
<input checked="" type="checkbox"/> Comprehensive Business Auto Coverage Art. 22.1.6	\$ <u>1,000,000</u> per accident  If vehicles are used for transporting hazardous materials, the <b>Contractor</b> shall provide pollution liability broadened coverage for covered autos (endorsement CA 99 48) as well as proof of MCS 90  Additional Insured: 1. City of New York, including its officials and employees
<input type="checkbox"/> Pollution/Environmental Liability Art. 22.1.7	\$ _____ per occurrence  \$ _____ aggregate  Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Protection and Indemnity Art. 22.1.8(a)	\$ _____ per occurrence  \$ _____ aggregate  Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____

**SCHEDULE A (FOR PUBLICLY BID PROJECTS)**

**Relating to Article 22 - Insurance**

**PART I. Minimum Limits and Special Conditions (Continued)**

Insurance indicated by a blackened box (■) or by (X) in the  to left will be required under this contract.

<input type="checkbox"/> Ship Repairers Legal Liability      Art. 22.1.8(b)	\$ _____ each occurrence [Contracting agency to fill in total value of City vessels involved]
<input type="checkbox"/> Collision Liability/Towers Liability      Art. 22.1.8(c)	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Marine Pollution Liability      Art. 22.1.8(d)	\$ _____ each occurrence Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
[OTHER]      Art. 22.1.9 <input type="checkbox"/> Railroad Protective Liability      _____	\$ _____ per occurrence \$ _____ aggregate Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____



**SCHEDULE A (FOR PUBLICLY BID PROJECTS)**

**Relating to Article 22 - Insurance**

**PART II. Broker's Certification**

[Pursuant to Article 22.3.1(a) of the **Contract**, every Certificate of Insurance must be accompanied by either the following certification by the broker setting forth the following text and required information and signatures or complete copies of all policies referenced in the Certificate of Insurance. In the absence of completed policies, binders are acceptable.]

**CERTIFICATION BY BROKER**

The undersigned insurance broker represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects, and that the described insurance is effective as of the date of this Certification.

\_\_\_\_\_  
[Name of broker (typewritten)]

\_\_\_\_\_  
[Address of broker (typewritten)]

\_\_\_\_\_  
[Signature of authorized official or broker]

\_\_\_\_\_  
[Name and title of authorized official (typewritten)]

Sworn to before me this  
\_\_\_\_ day of \_\_\_\_\_, 201\_\_

\_\_\_\_\_  
NOTARY PUBLIC

**SCHEDULE A (FOR PUBLICLY BID PROJECTS)**

**Relating to Article 22 - Insurance**

**PART III. Address of Commissioner**

Wherever reference is made in Article 7 or Article 22 to documents to be sent to the **Commissioner** (e.g., notices, filings, or submissions), such documents shall be sent to the address set forth below or, in the absence of such address, to the **Commissioner's** address as provided elsewhere in this **Contract**.

ACCO's Office, Insurance Unit

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30-30 Thomson Avenue, 4<sup>th</sup> Floor

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Long Island City, New York 11101

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## SCHEDULE B

### Guarantees and Warranties

(Reference: Article 1.22 of the General Conditions)

#### **GUARANTY FROM CONTRACTOR**

**(1) Contractor's Guaranty Obligation:** The Contractor shall promptly repair, replace, restore or rebuild, as the Commissioner may determine, any finished Work in which defects of materials or workmanship may appear or to which damage may occur because of such defects, during the one (1) year period subsequent to the date of Substantial Completion (or use and occupancy in accordance with the Contract), except for the areas of Work set forth below:

- Roofing and Waterproofing Work. For roofing work and waterproofing work, the guarantee period shall be (2) two years.
- Trees and/or Plant Material. For trees and/or plant material furnished and installed, the guarantee period shall be (2) two years. During the guarantee period, the Contractor shall provide all maintenance services set forth in the Specifications.

**(2) Guaranty Period:** The obligation of the Contractor, and its Surety under the Performance Bond, is limited to the period(s) of time specified above.

**(3) Other Provisions Deemed Deleted:** In the event the Specifications and/or the Contract Drawings contain any provisions regarding guaranty requirements, such provisions are deemed deleted and replaced with the guaranty requirements set forth in this Schedule B.

\*\*\*\*\*

#### **WARRANTY FROM MANUFACTURER**

**(1) Contractor's Obligation to Provide Warranties:** The items of material and/or equipment for which manufacturer warranties are required are listed below. For each item of material and/or equipment listed below, the Contractor shall obtain a written warranty from the manufacturer. Such warranty shall provide that the material or equipment is free from defects for the period set forth below and will be replaced or repaired within such specified period. The Contractor shall deliver all required warranties to the Commissioner.

**(2) Required Warranties:**

<b>Specification Number</b>	<b>Material or Equipment</b>	<b>Warranty Period</b>
064023	Architectural Woodwork	10 years (Corian)
071610	Capillary Waterproofing	10 years
072419	Exterior Insulation and Finish System	10 years
075000	Existing Roof Work	renew/maintain existing
075500	Modified Bitumen Roofing	20 years (manufacturer)
075500	Modified Bitumen Roofing	20 years (installer)
076200	Sheet Metal Work	10 years
078100	Sprayed Fire-Resistive Materials	3 years
084228	All Glass Doors and Partitions	2 years
085200	Exterior Windows and Doors	5 years
085200	Insulating Glass	10 years
088000	Coated Glass Products	5 years
088000	Insulating Glass	10 years
088000	Laminated Glass	5 years

089000	Louvers and Vents Finishes	20 years
096263	Aluminum Flooring	2 years
096400	Wood Strip Flooring	3 years
096813	Carpet Tile	2 years
096816	Carpet (Glue Down)	5 years (manufacturer)
096816	Carpet (Glue Down)	2 years (installer)
105626	Mobile Storage Shelving Units	1 year
122413	Window Shades	25 years
142423	Hydraulic Passenger Elevator	1 year
171000	Structured Cabling	16 years
237413	Packaged, Outdoor, Central-Station AHU	12-18 months (parts)
237413	Packaged, Outdoor, Central-Station AHU	5 years (compressor parts)
237413	Packaged, Outdoor, Central-Station AHU	10 year (heat exchanger)
238219	Fan Coil Units	5 years
238219	Fan Coil Units	5 years (compressor)
238219	Fan Coil Units	5 years (condenser coil only)
262413	Switchboards	5 years
262416	Panelboards	5 years
312000	Earthwork	General Project Warr. Period

(3) **Application:** The obligations under the warranty for the periods specified above shall apply only to the manufacturer of the material or equipment, and not to the Contractor or its Surety; provided, however, the Contractor retains responsibility for obtaining all required warranties from the manufacturers and delivering the same to the Commissioner.

(4) **Other Provisions:** The warranty requirements set forth in this Schedule B are also included in the Specifications.

- (a) In the event of any conflict between a warranty requirement set forth in the Specifications and a warranty requirement set forth in Schedule B, the warranty requirement set forth in Schedule B shall take precedence.
- (b) In the event a warranty requirement set forth in the Specifications is omitted from Schedule B, such omission from Schedule B shall have no effect and the Contractor's obligation to provide the manufacturer's warranty, as set forth in the Specifications, shall remain in full force and effect.
- (c) In the event a warranty requirement for a particular item of material or equipment is omitted from both Schedule B and the Specifications, and the manufacturer of such item actually provides a warranty, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by that manufacturer.
- (d) In the event a warranty requirement is provided for a particular item of material or equipment, and such requirement specifies a warranty period that is longer than that which is actually provided by any of the specified manufacturers, the Contractor shall be obligated to obtain and deliver to the Commissioner the highest level of warranty actually provided by any of the specified manufacturers, unless otherwise directed in writing by the Commissioner.

## SCHEDULE C

### Contract Drawings

(Reference: Article 1.04(A) of the General Conditions)

The Schedule set forth below lists all Contract Drawings for the Project.

DRAWING T000	TITLE SHEET, KEY PLAN & DRAWING SCHEDULE
DRAWING G100	GENERAL NOTES
DRAWING G101	SYMBOLS, ABBREVIATIONS & MOUNTING HEIGHTS
DRAWING G102	ACCESSIBILITY DIAGRAMS
DRAWING CC001	CODE COMPLIANCE ANALYSIS & DIAGRAMS
DRAWING Z100	ZONING ANALYSIS & DIAGRAMS
DRAWING EN100	ENERGY CODE COMPLIANCE ANALYSIS
DRAWING H001	ASBESTOS ABATEMENT GENERAL NOTES
DRAWING H002	ASBESTOS ABATEMENT CELLAR PLAN
DRAWING H003	ASBESTOS ABATEMENT FIRST FLOOR AND MEZZANINE PLAN
DRAWING H004	ASBESTOS ABATEMENT SECOND FLOOR PLAN
DRAWING H005	ASBESTOS ABATEMENT THIRD FLOOR PLAN
DRAWING H006	ASBESTOS ABATEMENT ROOF PLAN
DRAWING DM100	CELLAR DEMOLITION PLAN
DRAWING DM101	1ST FLOOR DEMOLITION PLAN
DRAWING DM101M	MEZZANINE FLOOR DEMOLITION PLAN
DRAWING DM102	2ND FLOOR DEMOLITION PLAN
DRAWING DM103	3RD FLOOR DEMOLITION PLAN
DRAWING DM104	ROOF DEMOLITION PLAN
DRAWING DM200	CELLAR DEMOLITION RCP
DRAWING DM201	1ST FLOOR AND MEZZANINE DEMOLITION RCP
DRAWING DM202	2ND FLOOR DEMOLITION RCP
DRAWING DM203	3RD FLOOR DEMOLITION RCP
DRAWING DM300	DEMOLITION EXTERIOR ELEVATIONS
DRAWING DM401	N/S DEMOLITION SECTION
DRAWING A100	CELLAR FLOOR PLAN
DRAWING A101	1ST FLOOR PLAN
DRAWING A101M	MEZZANINE FLOOR PLAN
DRAWING A102	2ND FLOOR PLAN
DRAWING A103	3RD FLOOR PLAN
DRAWING A104	ROOF PLAN
DRAWING A141	1ST FLOOR CONDUIT ROUTING PLAN
DRAWING A142	2ND FLOOR CONDUIT ROUTING PLAN
DRAWING A200	CELLAR REFLECTED CEILING PLAN
DRAWING A201	1ST FLOOR & MEZZ. REFLECTED CEILING PLAN
DRAWING A202	2ND FLOOR REFLECTED CEILING PLAN
DRAWING A203	3RD FLOOR REFLECTED CEILING PLAN
DRAWING A300	EXTERIOR ELEVATIONS

DRAWING A401	N/S BUILDING SECTION AT STAIR
DRAWING A402	N/S BUILDING SECTION
DRAWING A403	E/W BUILDING SECTIONS
DRAWING A404	N/S SECTION AT RATED ENCLOSURE
DRAWING A410	WALL SECTIONS
DRAWING A500	INTERIOR ELEVATIONS FIRST FLOOR
DRAWING A501	INTERIOR ELEVATIONS FIRST FLOOR
DRAWING A502	INTERIOR ELEVATIONS SECOND FLOOR
DRAWING A503	INTERIOR ELEVATIONS SECOND FLOOR
DRAWING A504	INTERIOR ELEVATIONS THIRD FLOOR
DRAWING A505	INTERIOR ELEVATIONS CELLAR
DRAWING A506	INTERIOR ELEVATIONS CELLAR
DRAWING A600	EXTERIOR DETAILS
DRAWING A601	EXTERIOR DETAILS
DRAWING A700	INTERIOR DETAILS: STAIR 1 PLANS & SECTIONS
DRAWING A701	INTERIOR DETAILS: STAIR 1
DRAWING A702	INTERIOR DETAILS: STAIR 1 GUARDRAIL ELEVATIONS
DRAWING A703	INTERIOR DETAILS: STAIR 1 ELEVATIONS
DRAWING A704	INTERIOR DETAILS: STAIR 1
DRAWING A705	INTERIOR DETAILS: ELEVATOR
DRAWING A706	INTERIOR DETAILS: ELEVATOR PLAN, RCP & ELEVATIONS
DRAWING A707	INTERIOR DETAILS: ELEVATORS & STAIRS
DRAWING A708	INTERIOR DETAILS
DRAWING A711	INTERIOR DETAILS: TOILETS
DRAWING A720	INTERIOR DETAILS: VESTIBULE
DRAWING A721	INTERIOR DETAILS
DRAWING A722	INTERIOR DETAILS
DRAWING A723	INTERIOR DETAILS
DRAWING A724	INTERIOR DETAILS
DRAWING A800	CELLAR FLOOR FINISH PLAN
DRAWING A801	1ST FLOOR FINISH PLAN
DRAWING A802	2ND FLOOR FINISH PLAN
DRAWING A803	3RD FLOOR FINISH PLAN
DRAWING A840	FINISH SCHEDULE, KEY & DETAILS
DRAWING A850	PARTITION SCHEDULE & DETAILS
DRAWING A860	DOOR SCHEDULE
DRAWING A861	DOOR DETAILS
DRAWING A862	DOOR DETAILS
DRAWING A880	WINDOW & LOUVER SCHEDULES & DETAILS
DRAWING A900	CELLAR COORDINATED DEVICE, FURNITURE & EQUIPMENT PLAN
DRAWING A901	1ST FLOOR COORDINATED DEVICE, FURNITURE & EQUIPMENT PLAN
DRAWING A902	2ND FLOOR COORDINATED DEVICE, FURNITURE & EQUIPMENT PLAN
DRAWING A903	3RD FLOOR COORDINATED DEVICE, FURNITURE & EQUIPMENT PLAN
DRAWING A940	MILLWORK: CIRCULATION DESK 1A
DRAWING A941	MILLWORK: CIRCULATION DESK 1B
DRAWING A942	MILLWORK: SELF-CHECK 1
DRAWING A943	MILLWORK: SERVICE DESK & SELF-CHECK 2
DRAWING A944	MILLWORK: DONUT COMPUTER TABLE
DRAWING A945	MILLWORK: BOOK STACKS 1 & 2
DRAWING A946	MILLWORK: NOTICE BOARD, BROCHURE BEAM & DISPLAY
DRAWING A980	SIGNAGE & GRAPHICS: SCHEDULES & KEY PLANS
DRAWING A981	SIGNAGE & GRAPHICS

DRAWING FO100 FOUNDATION PLAN  
 DRAWING S101 1ST FLOOR FRAMING PLAN  
 DRAWING S101D 1ST FLOOR EXISTING STEEL REMOVAL PLAN  
 DRAWING S101M MEZZANINE FRAMING PLAN  
 DRAWING S102 2ND FLOOR FRAMING PLAN  
 DRAWING S103 3RD FLOOR FRAMING PLAN  
 DRAWING S104 ROOF FRAMING PLAN  
 DRAWING S200 STRUCTURAL GENERAL NOTES & TYP DETAILS  
 DRAWING S201 STRUCTURAL TYP DETAILS  
 DRAWING S202 STRUCTURAL TYP DETAILS  
 DRAWING S203 STRUCTURAL TYP DETAILS  
 DRAWING S204 STRUCTURAL TYP DETAILS & SCHEDULES  
 DRAWING S300 FOUNDATION SECTIONS  
 DRAWING S400 SECTIONS  
 DRAWING S405 STAIR SECTIONS  
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 DRAWING S407 SECTIONS

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DRAWING TE701 TECHNOLOGY RISER DIAGRAMS

## SCHEDULE D

### Electrical Motor Control Equipment

(Reference: Article 1.37, Part K of the General Conditions)

Requirements for electrical motor equipment may be included in one or more sections of the Specifications for the Contract for the Project. Schedule D set forth below delineates specific information for electrical motor control equipment. In the event of any conflict between the Specifications and this Schedule D, Schedule D shall take precedence; provided, however, **in the event of an omission from Schedule D (i.e., Schedule D omits either a reference to or information concerning electrical motor equipment which is set forth in the Specifications or Drawings), such omission from Schedule D shall have no effect and the Contractor's obligation with respect to the electrical motor control equipment, as set forth in the Specifications, shall remain in full force and effect.**

#### Legend for Control Type

DB Disconnect Circuit Breaker (Switch)	P Pilot Light	BG Break Glass Station
TS Thermal Switch	F Firestat	HOA Hand-Off Auto.
MS Magnetic Starter	T Thermostat	PB Push Button Station
CMS Comb. Mag. Starter	AL Alternator	RO Remote "off"

Equip. Ident.	Location	# of Units	HP or KW	Volts and Phase	Control Type: See legend above	Remarks:
P-HV-B-1	Refer to drawings and specs				Refer to controls/sequences spec	
P-CUH-1	Refer to drawings and specs				Refer to controls/sequences spec	
EF-R-1	Refer to drawings and specs				Refer to controls/sequences spec	
EF-RTU-1	Refer to drawings and specs				Refer to controls/sequences spec	
EF-RTU-2	Refer to drawings and specs				Refer to controls/sequences spec	
Parts of packaged equipment	Refer to drawings and specs				Refer to controls/sequences spec and equipment spec.	

**SCHEDULE E**

**Separation of Trades**

**(Reference: Article 1.40 of the General Conditions)**

**NO TEXT**

**SCHEDULE F**

**Shop Drawing and Material Samples Schedule**

(Reference: Article 1.41 of the General Conditions)

The Schedule set forth below lists all submittal requirements for the Contract. In the event of any conflict between the Specifications and this Schedule F, Schedule F shall take precedence; provided, however, in the event of an omission from Schedule F (i.e., Schedule F omits either a reference to or information concerning a submittal requirement which is set forth in the Specifications), such omission from Schedule F shall have no effect and the Contractor's submittal obligation, as set forth in the Specifications, shall remain in full force and effect.

CONSULTANT: RICE+LIPKA ARCHITECTS  
 TELEPHONE NUMBER: 212-285-1003  
 DDC PROJECT MANAGER: MARIANA LISHNEVSKI  
 TELEPHONE NUMBER: 718-391-1234

DATE: \_\_\_\_\_  
 APPROVED: \_\_\_\_\_  
 (DDC RESIDENT ENGINEER/CPM)

SPEC. SECT. #	DESCRIPTION	COORD. WITH CONTR.	SUBMITTAL			SUB. DATE	RECD DEL.	FABRIC. TIME	SUBMISSIONS										
			SHOP DWG.	SAMPLE	CAT. CUTS				RECD	RETD	ACTION	RECD	RETD	ACTION	RECD	RETD	ACTION		
016400	Security System				x														
024119	Selective Demolition and Alteration Work*		Procedures, sequences																
033000	Cast-In-Place Concrete*		x	x	x														
033300	Architectural Cast-In-Place Concrete*		x	x															
035300	Concrete Floor Topping*																		
035416	Cement Leveling Compound*				x														
040100	Masonry Restoration and Cleaning*																		
042000	Unit Masonry*		x	x															
051200	Structural Steel*			x	x														
053100	Steel Decking*			x	x														



SPEC. SECT. #	DESCRIPTION (*LEED Submitt.)	COORD. WITH CONTR.	SUBMITTAL			SUB. DATE	REQ'D DEL.	FABRIC. TIME	SUBMISSIONS											
			SHOP DWG.	SAMPLE	CAT. CUTS				REC'D	RETD	ACTION	REC'D	RETD	ACTION	REC'D	RETD	ACTION			
084228	All Glass Doors and Partitions*		X	X	X															
085200	Exterior Wood Windows and Doors*		X	X + mock-ups																
088000	Glass and Glazing*		X (calc. & test reports)	X (sel. & verif.)																
089000	Louvers and Vents*		X	X	X															
090120	Plaster Restoration*																			
092000	Interior Plaster Work*		X (material list)		X															
092713	Glass-Fiber Reinforced Gypsum Fabrications*		X	X																
092900	Gypsum Drywall*		X (& test reports)	X	X															
093013	Ceramic Tiling*			X																
096263	Aluminum Flooring*		X	X (sel. & verif.)																
096400	Wood Strip Flooring*			X	X															
096510	Resilient Sheet Flooring*			X	X (maintenance instructions)															
096813	Carpet Tile*			X	X (certification, maintenance instructions)															
096816	Carpet (Glue Down)*		X	X																
097200	Walkcovering*			X	X (certificates)															
099000	Painting and Finishing*			X																







SPEC. SECT. #	DESCRIPTION (LEED Submitt.)	COORD. WITH CONTR.	SUBMITTAL			SUB. DATE	REC'D DEL.	FABRIC. TIME	SUBMISSIONS										
			SHOP DWG.	SAMPLE	CAT. CUTS (Data Test&C ert.)				REC'D	RETD	ACTION	REC'D	RETD	ACTION	REC'D	RETD	ACTION		
262816	Enclosed Switches/Circuit Breakers		X		(Data Test&C ert.)														
270528	Communications Pathways		X																
271000	Communications Cabling System		X	X															
272506	Communications Grounding & Bonding		X																
283111	Digital, Addressable Fire-Alarm System		X		(Data Test&C ert.)														

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**CONTRACT # 1**  
**GENERAL CONSTRUCTION WORK**

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## SECTION 011000

### SUMMARY OF WORK

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes the following descriptions:
  - 1. Project Work Criteria
  - 2. Contractor's duties.
  - 3. Codes.

##### 1.3 PROJECT DESCRIPTION

- A. The Project consists of the full renovation of the first and second floor of this historic branch library designed by McKim, Mead and White, as well as two necessary measures to make the library accessible: the insertion of a new elevator and the replacement of an enclosed egress stair with a new open stair. The project scope includes – but is not limited to - asbestos abatement, new wall and floor finishes, new ceilings, new lighting, new electrical, new mechanical systems, a new sprinkler system for the cellar and around the open stair, a new fire alarm system and a new security system, as well as new millwork.

##### 1.4 PROJECT WORK CRITERIA

- A. NY Landmark Status and Eligibility for National Register of Historic Places
  - 1. The existing building is a New York City Landmark and has been certified as being eligible for the inclusion into the National Register of Historic Places.
- B. Exterior Work Criteria
  - 1. The exterior work of the project documented in the design documents has been presented to the New York Landmarks Preservation Commission and has been approved as indicated. The presented scope includes the new front door, the new back windows, as well as the new mechanical equipment on the roof. The mechanical equipment on the roof has been presented in the

indicated locations, dimension or height projections and accepted as such – modifications from the indicated locations, dimensions or height projections will not be accepted.

C. Interior Work Criteria

1. As the existing building has been certified as being eligible for the inclusion to the National Register of Historic Places, all new work has to be done carefully to in order not to jeopardize this status. Wall, ceiling and column moldings must be repaired and reconstructed to precisely match the existing with no visible points of transition between new/existing in order for it to appear of original construction. All new pipes and wires must be installed concealed in existing construction to remain, or in new construction, as indicated in the construction documents. Surface installations other than indicated in the interior elevations and other drawings will not be accepted.

1.5 CONTRACTOR'S DUTIES

- A. Except as specifically noted, provide and pay for:
  1. Labor, materials and equipment.
  2. Tools, construction equipment and machinery.
  3. Other facilities and services necessary for proper execution and completion of the work.
- B. Pay required sales, consumer and use taxes, except as specifically excluded by the Supplementary Conditions.
- C. Secure and pay for, as necessary for proper execution and completion of work, and as applicable at time of Contract Award.
  1. Permits.
  2. Government fees.
  3. Licenses.
- D. Give required notices.
- E. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of work.
- F. Promptly submit written notice to the Commissioner of observed variance of Contract Documents from the Building Code and other requirements of Public Authorities having jurisdiction.

1.6 APPLICABLE CODES

- A. All references to codes, specifications, and standards referred to in the Specification Sections and on the Drawings shall mean, and are intended to be, the latest edition, amendment, and/or revision of such reference standard in effect as of the date of these Contract Documents.

PART 2 PRODUCTS – (NOT USED)

PART 3 EXECUTION – (NOT USED)

END OF SECTION

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SECTION 017419  
CONSTRUCTION WASTE REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS. Contract Drawings, conditions of Contract (including General Conditions, Addendum to the General Conditions, Special Conditions, Division 01 Specification Sections and all other Contract Documents) apply to the Work of the Section.

1.2 REQUIREMENTS OF THIS SECTION

- A. Waste Management Goals
- B. Waste Management Plan
- C. Progress Reports
- D. Project Meetings
- E. Management Plan Implementation

1.3 WASTE MANAGEMENT REQUIREMENTS

- A. The City of New York has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible, and as stated here, shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.
- C. The City of New York will seek LEED (Leadership in Energy and Environmental Design) certification for this Project at the Gold Level, from the U.S. Green Building Council. The documentation required here will be used for this purpose. LEED awards points for a variety of sustainable design measures on a project, one of which is the reuse and recycling of project waste.
- D. DIVERSION REQUIREMENTS. A minimum of 75% of total Project demolition and construction waste (by weight) shall be diverted from landfill. The following waste categories are likely candidates to be included in the diversion plan for this project:
  - 1. Land clearing debris, rock and dirt
  - 2. Concrete
  - 3. Bricks
  - 4. Concrete masonry units (CMU)
  - 5. Metals (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, brass, bronze)
  - 6. Cardboard, packaging
  - 7. Reuse items indicated on the Drawings and/or elsewhere in the SpecificationOther categories are acceptable and might include:
  - 8. Clean dimensional wood
  - 9. Asphalt shingles or roofing
  - 10. Drywall
  - 11. Carpet and pad
  - 12. Ceiling tiles
  - 13. Glass
- E. All fluorescent lamps, HID lamps and mercury-containing thermostats removed from the site shall be recycled.

- F. Recycling on the job, subject to the Commissioner's approval, is encouraged on the site itself, such as the crushing and reuse of removed sound concrete and stone. Include these categories in the Waste Management Plan.

#### 1.4 RELATED SECTIONS

- A. General Conditions
- B. Addendum to General Conditions
- C. Section 15060 Construction Waste Management
- D. Section 024119 Selective Demolition
- E. Section 230000 General Provisions for HVAC Work
- F. Section 220000 General Provisions for Plumbing Work
- G. Section 260000 General Provisions for Electrical Work

#### 1.5 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash debris and rubble resulting from construction, remodeling repair and demolition operations. Hazardous materials are not included.
- C. Diversion from Landfill: To remove, or have removed, from the site for recycling, reuse or salvage, material that might otherwise be sent to a landfill. Diversion from Landfill does not include using the material as alternative daily cover at a landfill site, nor does it include burning, incinerating or thermally destroying waste.
- D. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
- E. Recycle (recycling): To sort, separate, process, treat or reconstitute solid waste and other discarded materials for the purpose of redirecting such materials into the manufacture of useful products. Recycling does not include burning, incinerating or thermally destroying waste.
- F. Return: To give back reusable items or unused products to vendors.
- G. Reuse: To reuse excess or discarded construction material in some manner on the Project site.
- H. Salvage: To remove a waste material from the Project site for resale or reuse.
- I. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable and reusable material.
- J. Waste Management Plan: A project-related plan for the collection, transportation and disposal of waste generated at the construction site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill.

#### 1.6 REFERENCES, RESOURCES

- A. DDC encourages its contractors to seek information from websites and experts in salvage or recycling in order to minimize disposal costs. There are numerous opportunities to sell salvage, or to donate salvage and accrue tax benefits (which would accrue to the contractor); also there are outlets that will pick up, and in some cases buy recyclable materials. Examples of information resources are as follows:
  1. Outlets. For assistance in finding outlets for specific materials on specific projects, one possible source is New York Wa\$teMatch. Email: [wastematch@itac.org](mailto:wastematch@itac.org) Telephone: 212-442-5219
  2. DDC's Sustainable Design web site: <http://www.nyc.gov/html/ddc/html/ddcgreen> This includes a manual on Construction and Demolition Waste Reduction and Recycling, a Sample Waste Management Plan and a list of internet resources.

3. Directory of Construction and Demolition Waste Processors. A list of local recycling processors is available from New York City Department of Design and Construction, Office of Sustainable Design. DDC's consultants and contractors can request this list by contacting [greeninfo@ddc.nyc.gov](mailto:greeninfo@ddc.nyc.gov). This list is provided for information only and is not necessarily comprehensive; other haulers and markets are acceptable.
4. Web Resources  
(Information only; no warranty or endorsement is implied.)  
[www.wastematch.org](http://www.wastematch.org) Site of New York Wa\$te Match, a materials exchange database and service  
[www.usgbc.org](http://www.usgbc.org) Site of the United States Green Building Council, with a description of the LEED certification process and requirements for C&D waste recycling  
<http://www.epa.gov/epaoswer/non-hw/debris-new> Site of the U.S. Environmental Protection Agency that discusses construction and demolition waste issues, and links to other resources.

## 1.7 SUBMITTALS

- B. The Contractor for General Construction Work shall be responsible for the development and implementation of a Waste Management Plan for the Project. All Prime Contractors shall assist in the development of that Plan, and collect, sort and deposit their waste and recyclable materials in accordance with the approved Plan.
- C. DRAFT WASTE MANAGEMENT PLAN. Within 30 days after receipt of Notice to Proceed, or prior to any waste removal, whichever occurs sooner, the Contractor for General Construction Work shall submit to the Commissioner a Draft Waste Management Plan. The Draft Plan shall contain the following:
  1. Estimate of the total proposed jobsite waste to be generated, including types and quantities.
  2. Proposed alternatives to Landfilling: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed destination for each material, and the projected amount (by weight or CY)
- D. FINAL WASTE MANAGEMENT PLAN. Within 14 days of Commissioner's approval of the Draft Plan, the Contractor for General Construction Work shall submit a Final Waste Management Plan. It shall contain the following:
  1. Estimate of the total proposed jobsite waste to be generated, including types and quantities.
  2. Proposed alternatives to Landfilling: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed destination for each material, and the projected amount (by weight or CY)
  3. Materials handling procedures. A description of the means by which any waste materials identified in item (2) above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with the requirements for acceptance by recycling processors to be utilized.
  4. List of documentation to be provided in Progress Reports.

## 1.8 PROGRESS REPORTS

- A. The Contractor for General Construction Work shall submit monthly a Waste Management Progress Report, containing the following information:
  1. Project title, name of company completing report, and dates of period covered by the report
  2. Report on the disposal of all jobsite waste, including:
    - A. Recycled materials. For each material, provide the following:
      - 1) Amount ( in tons or cubic yards)

- 2) Dates removed from the jobsite
  - 3) Receiving Party
  - B. Reused or salvaged materials. For each material, provide the following:
    - 1) Amount ( in tons or cubic yards)
    - 2) Description of intended or actual use
  - C. Landfilled materials. Provide the following:
    - 1) Amount ( in tons or cubic yards)
    - 2) Dates removed from the jobsite
    - 3) Identity of the transfer station or landfill
3. Include legible copies of on-site logs, weight tickets and receipts. Receipts shall be from recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, recycling or disposal. If mixed construction and demolition waste is sorted off-site, provide a letter from the processor stating the average percentage of mixed C&D waste they recycle. Contractor shall save such original documents (as above) for the life of the project plus 2 years, though at a minimum until LEED certificate has been issued by USGBC.

#### 1.9 PROJECT MEETINGS

- A. Waste management plans and implementation shall be discussed at the following meetings:
  - 1. Pre-demolition meeting
  - 2. Pre-construction meeting
  - 3. Regular job-site meetings
  - 4. Contractor toolbox meetings

#### PART 2 PRODUCTS (Not Used)

#### PART 3 EXECUTION

##### 3.1 WASTE MANAGEMENT PLAN EXECUTION

- A. The Contractor for General Construction Work shall be responsible for the provision of containers and the removal of all waste, non-returned surplus materials, and rubbish from the site in accordance with the Waste Management Plan. The Contractor for General Construction Work shall oversee and document the results of the Plan. The Prime Contractors shall be responsible for collecting, sorting, and depositing in designated areas, their waste, non-returned surplus materials, and rubbish, as per the Waste Management Plan. Monies received for recycling materials shall remain with the Contractor for General Construction Work. Monies received for salvaged materials shall remain with the Contractor for General Construction Work, except for those items specifically identified in the specifications, or indicated on the drawings.
- B. Distribution. The Contractor for General Construction Work shall distribute copies of the Waste Management Plan to each Prime Contractor, Subcontractor, Resident Engineer, Construction Manager, and Commissioner.
- C. Instruction. The Contractor for General Construction Work shall provide on-site instruction of appropriate separation, handling and recycling, salvage, reuse and return methods to be used by all parties in appropriate stages of the Project.
- D. Separation facilities. The Contractor for General Construction Work shall lay out a specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse and return. Each potential

material shall be collected and stored to avoid being mixed with other materials. Recycling and waste bin areas are to be kept neat and clean, and clearly marked.

END OF SECTION

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## SECTION 018113

### SUSTAINABLE DESIGN REQUIREMENTS (LEED BUILDING)

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

###### A. LEED BUILDING - GENERAL REQUIREMENTS:

The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

###### B. Related Sections include the following:

1. Division 1, Section 018419 – Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings
2. Division 1, Section 017419 - Construction Waste Requirements
3. Division 1, Section 018119 - Construction IAQ Requirements

##### 1.3 DEFINITIONS

- A. **Certificates of Chain-of-Custody:** Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria." Certificates shall include evidence that mill is certified for chain-of-custody by an FSC-accredited certification body.
- B. **LEED:** The Leadership in Energy & Environmental Design rating system developed by the United States Green Building Council. LEED for New Construction (NC), Version 2.2, is the rating system used for this project.
- C. **Rapidly Renewable Materials:** Materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.

- D. Regionally Manufactured Materials: Materials that are manufactured within a radius of 500 miles from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.
- E. Regionally Extracted, Harvested, or Recovered Materials: Materials that are extracted, harvested, or recovered and manufactured within a radius of 500 miles from the Project site.
- F. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
  - 1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
  - 2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

#### 1.4 LEED PROVISIONS

- A. The provisions to achieve a LEED Gold rating are integrated within the project construction documents and specifications. Contractors are specifically directed to the "LEED BUILDING Performance Criteria" and "LEED BUILDING Submittals" sections within each specification. Additional LEED requirements are met through aspects of the project design, including material and equipment selections, which may not be specifically identified as LEED BUILDING requirements. Compliance with the requirements needed to obtain LEED prerequisites and credits will be used as one criterion to evaluate substitution requests.
- B. A LEED Scorecard, which summarizes the targeted LEED points for this project, is included as an attachment to this section. The scorecard is provided for the contractor's reference only.

#### 1.5 LEED BUILDING SUBMITTALS

- A. Scope: LEED BUILDING Submittals are required for all installed materials included under Divisions 2 through 14 of this specification. For specification Divisions 21-28, LEED BUILDING Submittals are only required for field-applied adhesives, sealants, paints and coatings.
- B. Applicability: The extent of the LEED BUILDING Submittals varies depending on the specification section; applicable LEED BUILDING Submittals are listed under the "LEED BUILDING Submittals" heading in each section. The detailed requirements for the LEED BUILDING Submittals are defined in Item C below.
- C. Detailed Requirements: Items 1-11 below define the information and documents to be provided for each type of LEED BUILDING Submittal.
  - 1. ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM (EBMCF): Information to be supplied for this form (blank copy attached at end of this Section) shall include some or all of the following items, as identified in the LEED Submittal Requirements of each specification section:

- a) Cost breakdowns for the materials included in the contractor or sub-contractor's scope of work. Cost reporting shall include itemized material costs (excluding the contractor's labor, equipment, overhead and profit).
  - b) The percentages (by weight) of post-consumer and/or post-industrial recycled content in the supplied product(s).
  - c) Identification (Yes/No) of materials manufactured within 500 miles of the project site AND containing raw materials harvested or extracted within 500 miles of the project site.
  - d) Volatile Organic Compound (VOC) content of all field-applied adhesives, sealants, paints, and coatings, listed in grams/liter or lbs./gallon.
  - e) The amount of "FSC Certified" wood product(s) used.
2. EBMCF BACK-UP DOCUMENTATION: These documents are used to validate the information provided on the EBMCF (except cost data). For each material listed on the EBMCF, provide documentation to certify the material's LEED BUILDING attributes, as applicable:
- a) Recycled content: Provide published product literature or letter of certification on the manufacturer's letterhead certifying the amounts of post-consumer and/or post-industrial content.
  - b) Regional manufacturing AND Regional raw materials (within 500 miles): Provide published product literature or letter of certification on the manufacturer's letterhead indicating the city/state where the manufacturing plant is located, where each of the raw materials in the product were extracted, harvested or recovered and the distance in miles from the project site.
    1. If only some of the raw materials for a particular product or assembly originate within 500 miles of the project site, provide the percentage (by weight) that these materials comprise in the complete product.
  - c) VOC content: Provide Material Safety Data Sheets (MSDS) certifying the Volatile Organic Compound (VOC) content of the adhesive, sealant, paint, or coating products. VOC content is to be reported in grams/liter or lbs./gallon. If the MSDS does not show the product's VOC content, this information must be provided through other published product literature from the manufacturer, or stated in a letter of certification from the product manufacturer on the manufacturer's letterhead.
3. PRODUCT CUT SHEETS: Provide product cut sheets with the Contractor's or sub-contractor's stamp, confirming that the submitted products are the products installed in the Project.
4. CRI GREEN LABEL PLUS CERTIFICATION: For carpets and carpet cushions, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the products comply with the "Green Label Plus" IAQ testing program of the Carpet and Rug Institute of Dalton, GA.

5. **CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER RESINS:** For all composite wood, engineered wood and agrifiber products (including plywood, particleboard, and medium density fiberboard), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the products do not contain added urea-formaldehyde resins.
  6. **CERTIFICATION OF COMPOSITE WOOD OR AGRIFIBER LAMINATING ADHESIVES:** For all laminating adhesives used with composite wood, engineered wood and agrifiber products (e.g., adhesives used to laminate wood veneers to an engineered wood substrate), provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that that the adhesive products do not contain urea-formaldehyde.
  7. **FSC-CERTIFIED WOOD:**
    - a. Provide vendor invoices for each wood product that has been harvested in accordance with the "FSC Principles and Criteria" for well-managed forests developed by the Forest Stewardship Council (FSC). Invoices shall include chain-of-custody (COC) certificate numbers and itemized costs for all certified products.
    - b. For assemblies, provide the percentage (by cost and by weight) of the assembly that is FSC-certified wood.
  8. **GREEN SEAL COMPLIANCE:** Provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying that the following product types comply with the VOC limits and chemical component restrictions developed by the Green Seal organization of Washington, DC:
    - a. Topcoat paints: refer to Green Seal standard GS-11 (1<sup>st</sup> edition, May 1993)
    - b. Anti-corrosive and Anti-rust paints: refer to Green Seal standard GC-03 (2<sup>nd</sup> Edition, January 1997)
    - c. Aerosol Adhesives: refer to Green Seal standard GS-36 (1<sup>st</sup> edition, October 2000)
  9. **HIGH ALBEDO ROOFING MATERIALS:** For exposed roofing membranes, pavers, and ballast products, provide published product literature or letter from the manufacturer (on the manufacturer's letterhead) verifying the following minimum Solar Reflectance Index (SRI) values:
    - a. 78 for low-sloped roofing applications (slope  $\leq$  2:12)
    - b. 29 for steep-sloped roofing applications (slope  $\geq$  2:12)

SRI values shall be calculated according to ASTM E 1980. Reflectance shall be measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance shall be measured according to ASTM E 408 or ASTM C 1371.

Vegetated roof surfaces are exempt from the SRI criteria.
- D. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review. Incomplete or inaccurate LEED BUILDING submittals may be used as the basis for the Commissioner's rejection of products or assemblies. Incomplete or inaccurate LEED

BUILDING Submittals may be used as the basis for rejecting the submitted products or assemblies.

E. LEED Action Plans

1. Construction Waste Management Plan- Refer to Section 017419, Construction Waste Requirements for detailed submittal requirements.
2. Construction IAQ Management Plan- Refer to Section 018119, Construction IAQ Requirements, for detailed submittal requirements.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION – Not Used

END OF SECTION 018113



## SECTION 018119

### CONSTRUCTION IAQ REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT

- A. The City of New York has established that this Project shall minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Factors that contaminate indoor air, such as dust entering HVAC systems and ductwork, improper storage of materials on-site, poor housekeeping, shall be minimized.

##### 1.02 SUMMARY

- A. This Section includes requirements for the development of a Construction Indoor Air Quality Management Plan (alternately referred to as "the Plan"). Develop the Plan for approval by the Commissioner. The Plan shall be implemented throughout the duration of the project construction, and shall be documented as outlined in the Submittal Requirements of Item 1.08 below. The Plan is included as part of the LEED BUILDING requirements for the project.

##### 1.03 RELATED SECTIONS

- A. All sections of the Specifications related to interior construction, MEP systems, and items affecting indoor air quality.
- B. Division 1, Section 018419 – Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings.
- C. Division 1, Section 099000 – Painting and Finishing.

##### 1.04 DEFINITIONS

- A. Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives; composite wood binder, and foam insulations. Not all VOC's are harmful, but many of those contained within building products contribute to the formation of smog and may irritate building occupants by their smell and/or health impact.
- B. Materials that act as "sinks" for VOC contamination: Absorptive materials, typically dry and soft (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOC's emitted by "source" materials and release them over a prolonged period of time.
- C. Materials that act as "sources" for VOC contamination: Products with high VOC contents that emit VOC's either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically "dry" products such flooring coverings with plasticizers and engineered wood with formaldehyde).

##### 1.05 REFERENCES, RESOURCES

- A. "IAQ Guidelines for Occupied Buildings Under Construction", First Edition, November 1995, The Sheet Metal and Air Conditioner Contractors National Association (SMACNA). (703) 803-2980, [www.smacna.org](http://www.smacna.org).

- B. ANSI/ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", [www.ashrae.org](http://www.ashrae.org)

#### 1.06 LEED BUILDING GENERAL REQUIREMENTS

- A. Implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; use of certified wood products; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this Section, are implemented to the fullest extent. Substitutions or other changes to the work shall not be allowed if such changes compromise the stated LEED BUILDING Performance Criteria.

#### 1.07 CONSTRUCTION IAQ MANAGEMENT PLAN

- A. The Contractor shall prepare and submit a Construction IAQ Management Plan to the Commissioner for approval. The Construction IAQ Management Plan shall meet the following criteria:
1. Construction activities shall be planned to meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) "IAQ Guidelines for Occupied Buildings under Construction", First Edition, 1995.
  2. Absorptive materials shall be protected from moisture damage when stored on-site and after installation.
  3. If air handlers are to be used during construction, filtration with a Minimum Efficiency Reporting Value (MERV) of 8 must be at each return air grill, as determined by ASHRAE 52.2-1999.
  4. A "Sequence of Finish Installation Plan" shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks".
  6. Upon approval of the Plan by the Commissioner, it shall be implemented through the duration of the construction process, and documented in accordance with the Submittal Requirements of Item 1.08 below.
- B. Further description of the Construction IAQ Management Plan requirements is as follows:
1. SMACNA Guidelines: Chapter 3 of the referenced "IAQ Guidelines for Occupied Buildings Under Construction", outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format, and shall address measures to be implemented in each of the five categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.
    - a. HVAC Protection
    - Central Filtration
    - Supply Side

- Duct Cleaning
- b. Source Control
    - Product Substitution
    - Modifying Equipment Operation
    - Changing Work Practices
    - Local Exhaust
    - Air Cleaning
    - Cover or Seal
  - c. Pathway Interruption
    - Depressurize Work Area
    - Pressurize Occupied Space
    - Erect Barriers to Contain Construction Areas
    - Relocate Pollutant Sources
    - Temporarily Seal the Building
  - d. Housekeeping
  - e. Scheduling
2. Protect of Materials from Moisture Damage: As part of the “Housekeeping” section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage shall be described. This section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.
  3. Replacement of Filtration Media: Under the “HVAC Protection” section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.
  4. Sequence of Finish Installation for Materials: Where feasible, absorptive materials shall be installed after the installation of materials or finishes which have high short-term emissions of VOC’s, formaldehyde, particulates, or other air-borne compounds. Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.
  5. Implementation and Coordination: Implement the Construction IAQ Management Plan, and coordinate the Plan with all affected trades. Designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Commissioner on a regular basis, and for assembling the required LEED documentation. Include provisions in the Construction IAQ Management Plan for

addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

#### 1.08 SUBMITTALS

The Construction IAQ Representative shall submit the following LEED-required records and documents:

- A. A copy of the Construction IAQ Management Plan as defined in section 1.07 of this specification.
- B. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets shall be submitted with the Contactor's or Subcontractor's 'approved' stamp as confirmation that the products are the products installed on the project.
- C. Provide the Commissioner with a minimum of 18 photographs comprising of at least six photographs taken on three different occasions during construction. The photographs shall document the implementation of the Construction IAQ Management Plan throughout the course of the project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs shall include integral date stamping, and shall be submitted with brief descriptions of the Construction IAQ Management Plan measure documented, or be referenced to project meeting minutes or similar project documents which reference to the Construction IAQ Management Plan measure documented.

#### 1.09 QUALITY ASSURANCE

The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the stated LEED BUILDING criteria.

#### PART 2 – PRODUCTS

Not used.

#### PART 3 – EXECUTION

##### 3.1 BUILDING AIR PURGING (FLUSH OUT)

- A. Purging must be conducted after construction and immediately prior to initial occupancy, for a period of at least two weeks, as follows:
  - 1. After construction ends and with all interior finishes installed, new MERV 13 filtration media is installed and the building is flushed out by supplying 100% outside air for a

minimum of two weeks **-OR-** total air volume of 14,000 ft<sup>3</sup> of outdoor air per ft<sup>2</sup> of floor area while maintaining an internal temperature of at least 60° F and, where mechanical cooling is operated, relative humidity no higher than 60%..

2. After flush-out, new MERV 13 filters must replace all filters except those solely processing outside air.

END OF SECTION

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## SECTION 018419

### VOC LIMITS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. This Section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for the project

##### 1.02 RELATED SECTIONS: The following Sections contain requirements that relate to this Section:

- A. All sections in the Specifications with adhesive, sealant or sealant primer applications. "Sustainable Design Requirements (LEED Building)", in Section 018113 – 1.05 D., shall be followed.
- B. Division 1, Section 18119: "Construction IAQ Requirements", for requirements for the Construction IAQ Management Plan. (LEED BUILDING)
- C. Division 9, Section 099000 PAINTING AND FINISHING

##### 1.03 GENERAL REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

##### 1.04 REFERENCES

- A. Rule 1168 – "Adhesive and Sealant Applications", amended 7 January 2005: South Coast Air Quality Management District (SCAQMD), State of California, [www.aqmd.gov](http://www.aqmd.gov)
- B. Rule 1113 - "Architectural Coatings", amended 9 July 2004: South Coast Air Quality Management District (SCAQMD), State of California, [www.aqmd.gov](http://www.aqmd.gov)
- C. Green Seal Standard GS-11- "Paints", of Green Seal, Inc., Washington, DC, [www.greenseal.org](http://www.greenseal.org)
- D. Green Seal Standard GC-03- "Anti-Corrosive Paints", of Green Seal, Inc., Washington, DC, [www.greenseal.org](http://www.greenseal.org)

##### 1.05 VOC REQUIREMENTS FOR INTERIOR ADHESIVES

- A. The volatile organic compound (VOC) content of adhesives, adhesive bonding primers, or adhesive primers used in this project shall not exceed the limits defined in Rule 1168 – "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California.

- B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1.06 GENERAL

- A. Unless otherwise specified below, the VOC content of all adhesives, adhesive bonding primers, or adhesive primers shall not be in excess of **250 grams per liter**.
- B. For specified building construction related applications, the allowable VOC content is as follows:

1. Architectural Applications:	
Indoor carpet adhesive	50
Carpet pad adhesive	50
Wood flooring adhesive	100
Rubber floor adhesive	60
Subfloor adhesive	50
Ceramic tile adhesive	65
VCT and asphalt tile adhesive	50
Drywall and panel adhesive	50
Cove base adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
2. Specialty Applications:	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact Adhesive	80
Special Purpose Contact Adhesive	250
Structural Wood Member Adhesive	140
Sheet Applied Rubber Lining Operations	850
3. Substrate Specific Applications:	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

1.07 VOC REQUIREMENTS FOR INTERIOR SEALANTS

- A. The volatile organic compound (VOC) content of sealants, or sealant primers used in this project shall not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications” of the South Coast Air Quality Management District (SCAQMD), of the State of California.
- B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Sealants:	
<b>Architectural</b>	<b>250</b>
Other	420
2. Sealant Primer:	
Architectural – Nonporous	250
Architectural – Porous	775
Other	750

#### 1.08 VOC REQUIREMENTS FOR INTERIOR PAINTS

##### A. Paints and Primers:

Paints and primers used in non-specialized interior applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) shall meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

##### 1. Volatile Organic Compounds:

- a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Interior Paints and Primers:

Non-flat: 150 g/l

Flat: 50 g/l

The calculation of VOC shall exclude water and tinting color added at the point of sale.

##### B. Anti-Corrosive and Anti-Rust Paints

Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates shall meet the VOC limitations of the Green Seal Paint Standard GC-03, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

##### 1. Volatile Organic Compounds:

- a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

Anti-Corrosive and Anti-Rust Paints:

250 g/l

The calculation of VOC shall exclude water and tinting color added at the point of sale.

## 1.09 VOC REQUIREMENTS FOR INTERIOR COATINGS

A. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior shall meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Clear Wood Finishes	
Varnish	350
Sanding Sealers	350
Lacquer	550
2. Shellac	
Clear	730
Pigmented	550
3. Stains	250
4. Floor Coatings	100
5. Waterproofing Sealers	250
6. Sanding Sealers	275
7. Other Sealers	200

The calculation of VOC shall exclude water and tinting color added at the point of sale.

### PART 2 PRODUCTS

- NOT USED -

### PART 3 EXECUTION

- NOT USED -

END OF SECTION

## SECTION 019100

### GENERAL COMMISSIONING REQUIREMENT

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. A Commissioning Agent (CxA), Dome-Tech, Inc., has been contracted to provide building system Commissioning (Cx) services for this project.
- B. The intent of this Specification is to:
  - 1. Familiarize the contractor with the Cx process and differences between a commissioned and "non-commissioned" project.
  - 2. Specify what labor / tasks are required by the contractor (and subcontractors) to support the commissioning effort, so the contractor (and subcontractors) can properly estimate the costs for this work. This specification should not be treated as an isolated document and must be read in conjunction with other related specifications as identified in section 1.4 of these specifications.

##### 1.2 DESCRIPTION

- A. Commissioning: Commissioning is a systematic process of ensuring that the building systems, including the mechanical and electrical systems, have been installed in the prescribed manner, are functionally checked and capable of being operated and maintained to perform with the design intent and have documentation to support proper installation and operation. The Commissioning Agent (CxA) shall provide the Owner with an unbiased, objective view of the system's installation, operation and performance. This process does not eliminate or reduce the responsibility of each system designer to provide a complete design or installing subcontractors to provide a finished product. Commissioning is intended to enhance the quality of each system installation, startup and transfer to beneficial use by the Owner.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives, according to the Contract Documents:
  - 1. Verify that applicable equipment and systems are installed according to the design, contract specification, manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
  - 2. Verify and document proper performance of equipment and systems.
  - 3. Verify that Operation & Maintenance documentation is complete and transferred to Owner.
  - 4. Verify that the Owner's operating personnel are adequately trained.
  - 5. Verify a contract is in place for a post occupancy review with O&M staff within 10 months after Substantial Completion.

C. The Commissioning process shall be a team effort and encompass, as well as coordinate, the traditionally separate functions of system documentation, system installation, equipment startup, control system calibration, testing, balancing and verification and performance checkouts.

D. The CxA will work closely with the construction team, cooperating on and coordinating all Cx activities with the CM/RE/Owner's representative, Trade Contractors, subcontractors, manufacturers and equipment suppliers.

E. The Cx process shall not reduce the responsibility of the construction management group (CM/RE/GC) to comply with the Contract Documents.

### 1.3 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, including 'LEED Requirement' apply to this Section.

### 1.4 RELATED SPECIFICATION SECTIONS INCLUDE

A. Division 23: HVAC specifications

B. Division 26: Electrical Specifications

### 1.5 DEFINITIONS

A. The following is a list of definitions utilized with this specification. Other definitions outlined in the General Conditions, Supplementary Conditions, Technical Specifications or other Contract Documents shall remain in effect.

1. Acceptance Phase: Phase of construction after installation completion, startup and initial checkout when functional performance tests, operation and maintenance documentation review and training occur.
2. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.
3. Architect/Engineer (A/E): The consultants who comprise the design team, generally the Architect, the HVAC Mechanical Engineer, the Plumbing Engineer and the Electrical Engineer.
4. Basis of Design (BOD): A document that records the concepts, calculations, decisions and product selections used to meet the Owner's Project Requirements and to satisfy applicable regulatory requirements, standards and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process. The Designer of Record produces this document.
5. Check Sheets: The step by step process that must be executed to fulfill the test requirements. The CxA shall develop the check sheets.
6. Commissioning Agent (CxA): The Commissioning Agent is an independent authority, not otherwise associated with the A/E team members, the CM/RE or

Trade Contractor. The CxA directs and coordinates day to day commissioning activities. The CxA does not take an project oversight role.

7. Commissioning Plan (CxP): An overall plan developed by the CxA before or after bidding that provides the structure, schedule and coordination planning for the Cx process.
8. Construction Manager (CM/RE) / Resident Engineer (RE): The CM/RE / RE or their authorized representative appointed by the owner.
9. Pre-functional / Installation Checklists (ICs): A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CxA to the Subcontractors. Installation checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension correct, oil levels, labels affixed, gages in place, sensors calibrated, etc.). The word installation refers to pre functional testing. Installation checklists augment and are combined with the manufacturer's startup checklist.
10. Contract Documents: The documents binding all concerned involved in the construction of this Project (Drawings, Specifications, Bulletins, Change Orders, Amendments, other Contracts, Commissioning plans, etc.) as defined in the General Conditions of the Contract.
11. Control System: The central building management control system. (BAS or BMS system)
12. Data Logging: Monitoring flows, currents, status, pressures, etc. of equipment, using standalone data loggers separate from the control system.
13. Design Intent (DI): An explanation of the ideas, concepts and criteria that are considered to be very important to the Owner. It is initially the outcome of the programming and conceptual design phases. The design intent is developed from the OPR and BOD.
14. Functional Performance Checks or Functional Checks (FCs): Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation, and components are verified to be responding as the sequences state. Traditional air or water test and balancing is not functional testing, in the commissioning sense. The Commissioning Authority develops the functional test procedures in a sequential written form. The FCs are generally developed from the approved sequence of operation and control logic in conformance to owner's project requirement and contract documents. CxA coordinates, oversees, witnesses and documents the actual testing, which is usually performed by the installing Contractor or vendor. Function tests are performed after installation checklists and startup by the contractors are complete.

15. Indirect Indicators: Indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.
16. Installing Contractor / Subcontractor: Contractor / Subcontractor who installs specific equipment and / or systems.
17. Issue: A condition in the installation or function of a component, piece of equipment or system that is not in compliance or conformance with the Contract Documents.
18. Issues Database: A formal and ongoing record of problems, deficiencies or concerns – and their resolution – that have been raised by members of the Commissioning Team during the course of Cx. ‘Issues database’ is the primary tracking tool to address all commissioning issues by the concerned parties. All issues must be addressed / closed by the concerned parties before close-out.
19. Manual Test: A test using handheld instruments, immediate control system readouts or direct observation to verify performance (as opposed to analyzing monitored data taken over time to make the “observation”).
20. Master Equipment List (MEL): A complete listing of all commissioned building equipment, including detail such as make, model, etc., that is taken from submittals and is the basis from which check sheets will be generated.
21. Monitoring: The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.
22. Overwritten Value: Writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value to verify economizer operation). See also “Simulated Signal”.
23. Owner: Owner, The City of New York
24. Owner Contracted Tests: Tests paid for by the Owner outside of the CM/RE’s Contract and for which the CxA does not provide oversight. These tests will not be repeated during functional tests if properly documented.
25. Owner’s Project Requirements (OPR): The Owner’s Project Requirements is the documentation of the primary thought processes and assumptions behind design decisions that were made to develop the Basis of Design (BOD and meet the design intent. The OPR describes the systems, components, conditions and methods chosen to meet the intent. Some reiterating of the design intent may be included.
26. Phased Commissioning: For projects that are anticipated to be completed in phases , commissioning that is completed in stages due to the size of the structure or other scheduling issues to minimize total construction time.
27. Sampling: Functional testing for a percent / fraction of the total number of identical or near identical pieces of equipment.
28. Seasonal Performance Tests: Functional tests that are deferred until or performed again when the system(s) will experience climate conditions closer to their design conditions.
29. Startup: The initial starting or activating of equipment, including executing construction checklists.

30. Subcontractors: The subcontractors that provide building components and systems under the General Construction Contractor.
31. Test Requirements: Requirements specifying what modes and functions, etc. shall be tested on any given piece of equipment or any given system (integrated and/or stand-alone). The test requirements are not the detailed test procedures. The test requirements for each system are specified in the respective section of the Contract Documents.
32. Testing, Adjust, Balance (TAB): Primary work is setting up the system flows and pressures as specified whereas functional testing is verifying that which has already been set up.
33. Trending: Monitoring using the building control system.
34. Vendor: Supplier of equipment.

## 1.6 REFERENCES

- A. General: Comply with the applicable provisions and recommendations of references, except as modified by governing codes and by the Contract Documents. Where a recommendation or suggestion occurs in the references, such recommendation or suggestion shall be considered mandatory. In the event of conflict between references, this specification or within themselves, the more stringent standard or requirement shall govern.
  1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE): "ASHRAE Guideline 1.1-2007 ASHRAE Guideline HVAC&R Technical Requirements for The Commissioning Process
  2. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE): "ASHRAE Guideline 0-2005 ASHRAE Guideline 'The Commissioning Process'".

## 1.7 COMMISSIONING TEAM

- A. Commissioning Team: The members of the commissioning team consist of the CxA, USER, CM/RE, the Architect and MEP Engineers, the Mechanical Trade Contractor, the Electrical Trade Contractor, the TAB representative (if independently retained), the Temperature Controls Contractor, as well as any other installing subcontractors or suppliers of equipment. The Owner's building or plant operator / engineer shall also be a member of the commissioning team.
- B. Members Appointed by CM/RE: Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of each Contractor, including Project superintendent and subcontractors, installers, suppliers and specialists deemed appropriate by the CxA.
- C. Members Appointed by Owner:
  1. Commissioning Agent (CxA): The designated person, company or entity that plans, schedules and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
  2. Construction Manager (CM/RE) and/or Resident Engineer (RE)

3. Representatives of the facility user and operation and maintenance personnel.
4. Architect and engineering design professionals.

1.8 OWNER'S RESPONSIBILITIES

- A. Provide the OPR & BOD documentation to the CxA and design team members for use in developing the commissioning plan; systems manual; operation and maintenance training plan; and testing plans and checklists.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
  1. Coordination meetings.
  2. Training in operation and maintenance of systems, subsystems, and equipment.
  3. Testing meetings.
  4. Demonstration of operation of systems, subsystems, and equipment.
- C. Provide the approved Contract Documents to the CxA and CM/RE for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.9 CONSTRUCTION MANAGER'S(CM/RE) and/or RESIDENT ENGINEER'S(re) RESPONSIBILITIES

- A. Provide utility services and any consumable required for the commissioning process.
- B. The CM/RE shall assign representatives with expertise and authority to act on behalf of the CM/RE and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
  1. Participate in design and construction phase coordination meetings.
  2. Insert Cx requirements into the master schedule.
  3. Participate in maintenance orientation and inspection.
  4. Participate in operation and maintenance training sessions.
  5. Participate in final review at acceptance meeting.
  6. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls. Notify the CxA when issues have been resolved.
  7. Schedule testing, training, and provide a minimum of 48 hours notice to CxA for witnessing the testing.
  8. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
  9. Review and approve final commissioning documentation.
  10. For enhanced commissioning, forward submittals to CxA for comment.

1.10 GC/SUB CONTRACTOR'S RESPONSIBILITIES

A. Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:

1. Participate in construction phase coordination meetings.
2. Demonstrate all sequences to CxA.
3. Participate in maintenance orientation and inspection.
4. Participate in procedures meeting for testing.
5. Execute Installation check sheets.
6. Support functional testing with qualified technicians.
7. Respond to Cx Issues Database within seven days of publication of issue.
8. Participate in final review at acceptance meeting.
9. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
10. Provide information to the CxA for developing construction phase commissioning plan.
11. Co-ordinate / Conduct training sessions for Owner's operation and maintenance personnel.
12. Provide updated Project Record Documents to the CxA on a daily / weekly basis.
13. Gather and submit operation and maintenance data for systems, subsystems and equipment to the CxA 45 days after acceptance.
14. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems and equipment.

#### 1.11 COMMISSIONING AGENT'S (CxA) RESPONSIBILITIES

A. The functions and responsibility of the CxA shall include:

1. Organization and leadership of the Commissioning team with primary responsibility to inform the Owner and CM/RE on the status, integration, and performance of systems within the facility.
2. Preparation of construction-phase commissioning plan and collaboration with CM/RE and appropriate subcontractors and suppliers to develop testing and inspection procedures including design changes and scheduled commissioning activities coordinated with overall Project schedule.
3. Scheduling: The CxA shall work with the CM/RE according to established protocols to schedule the commissioning activities. The CxA shall provide INPUTS to the CM/RE/RE for scheduling commissioning activities. The CM/RE shall integrate all commissioning activities into the master schedule. All parties shall address scheduling problems and make necessary notifications in a timely manner to expedite the commissioning process.

4. Identification of commissioning team member responsibilities by name, firm and trade specialty for performance of each commissioning task.
5. Convene commissioning team meetings for the purpose of coordination, communication and conflict resolution; discuss progress of commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists and notifying participants. The CxA shall prepare and distribute minutes to commissioning team members and attendees.
6. At the beginning of the construction phase, conduct an initial construction phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; testing, adjusting and balancing work; and Project completion.
7. Observe and inspect construction and report progress and deficiencies. In addition to compliance with the OPR, BOD and Contract Documents, inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.
8. Observation of Tests: CxA shall prepare, schedule (with the CM/RE), coordinate, direct, witness and document Project specific tests, inspections, checkout and startup procedures (performed by the contractors) as required to ensure equipment and system installation, operation and performance meets the design intent. The CxA shall provide technical inputs to oversee and verify the correction of open issues found during the commissioning process.
9. Compile test data, inspection reports and certificates and include them in the commissioning report.
10. Acceptance: The CxA shall recommend acceptance to the Owner for each component and system for start of the warranty period.
11. Review Project Record Documents for accuracy. Request revisions from CM/RE/RE to achieve accuracy.
12. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BOD and Contract Documents.
13. Review subcontractor submitted O&M & training documentation.
14. Prepare commissioning reports.
15. Assembly of the final commissioning documentation.
16. For enhanced commissioning, review and comment on submittals from CM/RE for compliance with the OPR, BOD, Contract Documents and construction phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the OPR and BOD.

B. The CxA is referred to as an independent contractor in this Section and shall work under a separate contract directly for the Owner. The CxA shall not be financially associated with any of the work of the contractors or subcontractors on this project to avoid potential conflicts of interest.

- 1.12 COMMISSIONING DOCUMENTATION (the definitions are already covered under 1.5)
- A. Owner's Project Requirements.
  - B. Basis of Design (BOD)
  - C. Commissioning Plan: The commissioning plan is a living document that will evolve over the course of the project and ultimately include:
    - 1. Description of the organization, layout and content of commissioning documentation and a detailed description of documents to be provided along with identification of responsible parties.
    - 2. Identification of systems and equipment to be commissioned.
    - 3. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
    - 4. Identification of items that must be completed before the next operation can proceed.
    - 5. Description of responsibilities of commissioning team members.
    - 6. Description of observations to be made.
    - 7. Schedule for commissioning activities
  - D. Pre-functional check / Installation Checks (IC):
  - E. Functional Checks(FC): The end goal is that all associated equipment and components are verified simultaneously to ensure that all elements operate as per the contract documents. Each checklist, regardless of system, subsystem or equipment being tested, shall include, but not limited to, the following:
    - 1. Name and tag of tested item.
    - 2. Date of test.
    - 3. Indication of whether the record is for a first test or retest following correction of a problem or issue.
    - 4. Dated signatures of the person performing test and of the witness if applicable.
    - 5. Deficiencies.
    - 6. Issues, if any, generated as the result of test in the note section
  - F. Test and Inspection Reports: CxA shall record test data, observations and measurements on test checklists.
  - G. Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.
  - H. Issues Database: CxA shall prepare and maintain an issues database that describes design, installation and performance issues that are at variance with the OPR, BOD and Contract

Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.

1. Documenting Issue Resolution:
  - a. Log date correction is completed or the issue is resolved.
  - b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue if any.
  - c. Identify changes to the Owner's Project Requirements, Basis of Design, or Contract Documents that may require action.
  - d. State that correction was completed and system, subsystem and equipment is ready for retest if applicable.
  - e. Identify person(s) who corrected or resolved the issue.
  - f. Identify person(s) documenting the issue resolution.
- l. Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems and equipment. The commissioning report shall indicate whether systems, subsystems and equipment have been completed and are performing according to the Owner's Project Requirements, Basis of Design and Contract Documents. The commissioning report shall include the following:
  1. Lists and explanations of substitutions; compromises; variances in the Owner's Project Requirements, Basis of Design and Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
  2. Owner's Project Requirements and Basis of Design documentation.
  3. Commissioning plan.
  4. Testing plans and reports.
  5. Corrective modification documentation.
  6. Issues database.
  7. Completed functional check sheets.
  8. Listing of any seasonal test(s) remaining and a schedule for their completion.
- J. Systems Operation Manual(SOM) : CxA shall gather required information and compile a systems manual for the benefit of the maintenance personnel.

#### 1.13 SUBMITTALS

- A. Commissioning Plans: Submit to Owner and Architect
- B. Testing: Submit to Owner and Architect
  1. Functional Checklists and Report Forms: CxA shall submit Prefunctional and functional test procedures to CM/RE/RE, A/E for review and comment.
  2. Test and Inspection Reports: Submit for Owner and Architect's information. CxA shall submit test and inspection reports.

- C. Corrective Action Documents: CxA shall submit corrective action documents in the form of 'Issues Log'

1.14 SYSTEMS TO BE COMMISSIONED

- A. All parties associated with the design, installation and / or testing of these systems shall comply with commissioning requirements specified in this section, in the individual Division commissioning sections and in the Commissioning Plan.
- B. Systems to be commissioned shall include:
- HVAC units
  - HVAC Controls
  - System Testing and Balancing
  - Fire alarm and sprinkler system (by code enforcement authority)
  - Electrical distribution

1.15 COORDINATION

- A. The Owner/CM/RE will furnish copies of all construction documents, addenda, change orders and appropriate approved submittals and shop drawings to the CxA.
- B. The CxA shall coordinate directly with the Owner / CM/RE on the project specific to their responsibilities and contractual obligations. If the contractor is a subcontractor to another contractor, the CxA shall disseminate written information to all responsible parties relative to the nature and extent of the communication.
- C. The CxA is primarily responsible to the Owner, and therefore shall regularly apprise the Owner of progress, pending problems and / or disputes, as well as provide regular status reports on progress with each system.
- D. The CxA shall coordinate the schedule of commissioning activities with the construction schedule. It is possible that some procedures will be completed before the entire mechanical or electrical system is completed.

1.16 SCHEDULE

- A. Commissioning of systems shall proceed per the criteria established with activities to be performed on a timely basis. The CxA shall be available with a 48 hour notice to respond promptly and avoid construction delays.
- B. Startup and testing of systems may proceed prior to final completion of systems to expedite progress. However, the CxA shall not schedule testing and checkout services that are the primary responsibility of the contractor / vendor in advance of their testing and checkout.
- C. Open issues observed shall be addressed immediately, responsible parties notified, and corrective actions coordinated in a timely manner.
- D. Construction schedules and scheduling are the responsibility of the CM/RE/RE. The CxA shall provide commissioning scheduling information to the Owner's Representative and CM/RE/RE for review and planning activities.

## 1.17 OTHER REQUIREMENTS

- A. Commissioning requires support from the CM/RE, GCC, Trade Contractors and subcontractors. The commissioning process does not relieve any contractors from their obligations to complete all portions of work in a satisfactory manner.
- B. Commissioning requirements in this section should not be confused with "commissioning" requirements at the end of various technical specification sections. Those requirements that are at the end of various technical specification sections are part of the quality control procedures and are to be completed by the respective contractor before the commissioning process begins.
- C. Refer to the Commissioning plan submitted by the CxA for a detailed description of all commissioning requirements and responsibilities for all involved parties including: Owner, Owner's Representative, Architect, Design Engineer, CM/RE, GCC, Trade Contractors, and Subcontractors.

## PART 2 PRODUCTS

### 2.1 TEST EQUIPMENT

- A. All industry standard test equipment required for performing the specified tests shall be provided by the appropriate party responsible for the testing. Any proprietary vendor specific test equipment shall be provided by that vendor or manufacturer.
- B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents, shall be included in the base bid price to the Trade Contractor and left on site, except for standalone data logging equipment that may be used by the CxA.
- C. If data logging equipment is required, the loggers and the necessary software shall be provided by the CxA but not become the property of the Owner.
- D. Any portable or handheld setup / calibration devices required to initialize the control system shall be made available by the control vendor (at no additional cost).
- E. The instrumentation used in the commissioning process shall comply with the following:
  - 1. Be of sufficient quality and accuracy to test and / or measure system performance within the tolerances required.
  - 2. Be calibrated at the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument.
  - 3. Be maintained in good repair and operating condition throughout use duration on this project.
  - 4. Be immediately recalibrated or repaired if dropped and / or damaged in any way during use on this project.

## PART 3 – EXECUTION

### 3.1 COMMISSIONING PLAN AND SCHEDULE

- A. The CxA shall provide a schedule identifying the commissioned system and commissioning process which is integrated by the CM/RE with the construction schedule. The required work by all team members (CxA, Trade Contractors and the Owner) shall be included. Overlay with the construction schedule, and include time for test and balance, Installation checkouts, as well as Functional testing.
- B. Commissioning Plan: The Commissioning Plan provides guidance in the execution of the Commissioning process. Just after the initial Commissioning kickoff meeting, the CxA will update the plan, which is then considered the “final” plan (though it will be a living document that continues to evolve and expand as the project progresses). The Specifications will take precedence over the Commissioning Plan.

### 3.2 COMMISSIONING PROCESS

- A. Commissioning Process: The following provides an overview of the Commissioning tasks during design and construction and the general order in which they occur.
  - 1. Design Phase
    - a. Commissioning during the design phase begins with a Commissioning kickoff meeting, chaired by the CxA, which the Commissioning process is set forth.
    - b. Commissioning shall include the design review (usually 75% DD, 75% CD and 100% CD), provide comments from commissioning perspective.
  - 2. Construction Phase
    - a. Commissioning during construction begins with a Commissioning orientation meeting, conducted by the CxA, where the Commissioning process is reviewed with the other Commissioning team members.
    - b. Additional meetings may be required throughout construction, scheduled by the CxA with necessary parties attending, to plan, scope, coordinate and schedule future activities and resolve open issues.
    - c. Equipment documentation for commissioned systems/equipment is submitted to the CxA for review, concurrent with normal submittals, including detailed startup procedures.
    - d. The CxA works with the CM/RE, Trade Contractors and subcontractors in developing IC/FC documentation formats.
    - e. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with Installation checklists being completed before Functional Performance Checklists.
    - f. The Subs, with guidance from the CxA, execute and document the Installation checklists and perform startup and initial checkout. The CxA documents that the checklists and startup were completed according to the approved plans. This may include the CxA witnessing portions of the

startup of selected equipment and spot checking the Installation check sheets.

- g. The CxA develops specific equipment and system Functional check sheets. The Subs receive copies of the procedures. The CxA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.
- h. The Functional and/or system performance check sheets are executed by the subs, witnessed by the CxA.
- i. Items of non-compliance in material, installation or setup are corrected and the system rechecked not to exceed one additional time.
- j. The CxA reviews the Operation & Maintenance documentation for completeness.
- k. Commissioning is completed before Substantial Completion.
- l. The CxA reviews the training documentation. The training schedules are provided by the Subs and CxA verifies that training was completed.
- m. Deferred testing / checkouts are conducted, as specified or required.

### 3.3 INSTALLATION / FUNCTIONAL PERFORMANCE

- A. Personnel experienced in the technical aspects of each system to be commissioned shall develop and document the commissioning procedure to be used. Include a performance checklist and performance checkout data sheets for each system based on actual system configuration. These procedures shall be reviewed by the Owner for technical depth, clarity of documentation and completeness. Special emphasis shall be placed on checkout procedures that shall conclusively determine actual system performance and compliance with the design intent.
- B. The majority of mechanical equipment requires safety devices to stop and / or prevent equipment operation unless minimum safety standards or conditions are met. These may include adequate oil pressure, proof-of-flow, non-freezing conditions, maximum static pressure, maximum head pressure, etc. The party responsible for checkout procedures shall observe the actual performance of safety shutoffs in a real or closely simulated condition of failure.
- C. Systems may include safety devices and components that control a variety of equipment operating as a system. Interlocks may be hard-wired or operate from software. The party responsible for commissioning checkout procedures shall verify operation of these interlocks.
- D. The CxA shall determine the acceptance procedures for each system within disciplines. The acceptance procedures shall incorporate the commissioning standards and successful testing results as referred to throughout specifications.

As a guidance for HVAC system acceptance, the following should be considered

- 1. The temperature control system shall have all I/O points individually verified for proper function, calibration, and operation. The CxA shall review proposed testing procedures and report formats, and observe sufficient field testing to confirm that all I/O points have been properly tested.

2. All control sequence of operation strategies, alarm generation and reporting shall also be reviewed and proper operation verified by the CM/RE and Trade Contractors with oversight by the CxA.
  3. The central work station graphics, point assignments, alarm messages, and logging functions shall be verified.
- E. The appropriate contractor and vendor(s) shall be informed of what tests are to be performed and the expected results. Whereas some test results and interpretations may not become evident until the actual tests are performed, all parties shall have a reasonable understanding of the requirements. The commissioning plan shall address those requirements and be distributed to all parties involved with that particular system.
  - F. Acceptance procedures shall confirm the performance of systems to the extent of the design intent. When a system is recommended to be accepted, the Owner shall be assured that the system is complete, works as intended, is correctly documented, and operator training has been performed.

#### 3.4 FUNCTIONAL PERFORMANCE TESTS – OBSERVATION / WITNESS

- A. The Functional Performance tests shall be performed by the contractors and vendors with oversight by the CxA. The CxA shall witness, verify and document these tests.
- B. Check sheets shall be completed comprehensively and to the extent necessary to enable the CxA to assure the Owner that the systems do perform per the owner's requirement.

#### 3.5 SOFTWARE DOCUMENTATION REVIEW

- A. Review software documentation for all DDC control systems. This includes review of vendor documentation and specific software routines applied to this project. Discrepancies in sequences shall be reported and coordinated to provide the Owner with the most appropriate, simple and straightforward approach to software routines.

#### 3.6 TESTING PREPARATION

- A. Prerequisites for Testing:
  1. Certify that commissioned systems, subsystems and equipment have been completed, calibrated and started; are operating according to the OPR, BOD and Contract Documents; and that Certificates of Readiness are signed and submitted.
  2. Certify that all relevant instrumentation and control systems have been completed and calibrated; are operating according to the OPR, BOD and Contract Documents; and that pretest set points have been recorded.
  3. Certify that testing, adjusting and balancing (TAB) procedures have been completed, and that TAB report have been submitted, discrepancies corrected and corrective work approved.
  4. Test systems and intersystem performance after approval of testing check sheets for systems, subsystems and equipment.
  5. Set systems, subsystems and equipment to operating mode to be tested (e.g., normal shut down, normal auto position, normal manual position, unoccupied cycle, emergency power and alarm conditions).
  6. Verify each mode of operation once it is operating in a steady state condition.

7. Inspect and verify the position of each device and interlock identified on checklists. Sign off each item as acceptable or failed. Repeat this test for each operating cycle that applies to system being tested.
  8. Check safety cutouts, alarms and interlocks with smoke control and life safety systems during each mode of operation when applicable.
  9. Annotate checklist or data sheet when a deficiency is observed.
  10. Verify equipment interface with monitoring and control system and the TAB
- B. Testing Instrumentation: Instrumentation shall monitor and record full range of operating conditions and shall allow for calculation of total capacity of system for each mode of operation. For individual room cooling tests, Operational modes may include the following:
1. Occupied and unoccupied.
  2. Warm up and cool down.
  3. Economizer cycle.
  4. Emergency power supply.
  5. Life safety and safety systems.
  6. Smoke control.
  7. Fire safety.
  8. Temporary upset of system operation.

### 3.7 TESTING

- A. Test systems and intersystem performance as per the test procedures. Perform tests using design conditions whenever possible.
1. Simulate conditions by imposing an artificial load when it is not practical to test under design conditions and when written approval for simulated conditions is received from CxA. Before simulating conditions, calibrate testing instruments. Set and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
  2. Alter setpoints when simulating conditions is not practical and when written approval is received from CxA.
  3. If a test is failed for reason and retesting is required, the concerned agency (contractor, equipment manufacturer) shall provide the service on an agreed upon date at no cost to the owner.
  4. Alter sensor values with a signal generator when design or simulating conditions and altering set points are not practical. Do not use sensor to act as signal generator to simulate conditions or override values.

### 3.8 COST OF RETESTING

- A. The cost for the GC/trade contractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs.
- B. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the following shall apply: The CxA will direct the retesting of the equipment once at no charge

to the owner for their time. However, the CxA's time for a second retest will be charged to the Owner, who may choose to recover costs from the responsible GC/Sub.

- C. The time for the CxA to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be charged to the owner, who may choose to recover costs from the party responsible for executing the faulty prefunctional test.
- D. Any required retesting by any contractor shall not be considered a justified reason for a claim of delay or for a time extension by the prime contractor or GC.

### 3.9 OPERATION & MAINTENANCE MANUALS

- 1. The CxA shall review the Operation & Maintenance manuals provided by Trade Contractors or subcontractors. The review process shall verify that Operation & Maintenance instructions meet specifications and are included for all equipment furnished by the Trade Contractor.
  - 2. Published literature shall be specifically oriented to the provided equipment, indicating the exact make and model #, required operation and maintenance procedures, parts lists, assembly / disassembly diagrams and related information.
  - 3. The Trade Contractor shall incorporate the standard technical literature into system specific formats for this facility as designed and as actually installed. The resulting Operation & Maintenance information shall be system specific, concise, to the point and tailored specifically to this facility. The CxA shall review and edit these documents as necessary for final corrections by the Trade Contractor.
- B. The Operation & Maintenance Manual review and coordination efforts shall be completed prior to Owner training sessions, as these documents are to be utilized in the training sessions.

### 3.10 SYSTEMS MANUAL

- A. Per Contract Documents and as part of LEED enhanced commissioning, the CxA shall prepare and deliver the documents that are required to periodically "tune up" building systems. The contractors will confirm the proper documents are onsite and readily available. Typically, the manual includes the following:
- 1. As built sequences of operation for all equipment and control drawings.
  - 2. List of programmed operation schedules and frequency for their review.
  - 3. Engineering narratives for all energy and water saving methods and equipment (supplied by the Engineer of Record).
  - 4. Narrative of seasonal operational issues, including seasonal startup and shutdown, manual and restart operation procedures, recommendations regarding seasonal operational issues that affect energy use.
  - 5. List of all user adjustable setpoints and reset schedules with a brief discussion of the purpose of each and the range of reasonable adjustments with energy implications.

6. Recommendations for recalibration frequency for sensors and actuators.
7. Recommendations for user adjustable setpoints and frequency of checking.
8. Recommended frequency of Recommissioning.
9. List of diagnostic tools and directions for use.

### 3.11 TRAINING

- A. The CM/RE shall schedule and coordinate training sessions for the Owner's staff for each system. Training shall be held per Contract Documents, along with the appropriate schematics, handouts and visual / audio training aids onsite with equipment.
- B. The appropriate installing Trade Contractor shall provide training on all the major systems per specifications, including peculiarities specific to this project.
- C. The equipment vendors shall provide training on the specifics of each major equipment item including philosophy, troubleshooting and repair techniques.
- D. The automatic control and fire alarm vendors shall provide training on the control system and fire alarm system per their specification section.
- E. For additional prescription pertinent to training, refer to other specific divisions for training requirements.

### 3.12 WARRANTY REVIEW / SEASONAL TESTING

- A. The CxA will return upon the start of the new season (cooling or heating) after project completion to conduct performance tests that could not be performed due to ambient conditions. The seasonal testing will only be performed if unsuitable loads / conditions were unavailable during the performance testing stages (in other words; the requirement for testing is warranted).
- B. If agreed upon by Owner, Seasonal Testing can also be used for the Warranty Review. During which the CxA will interview the occupants, maintenance staff, review the operation of the building, provide recommendations for installation and operational problems and document warranty and operational issues in the issues database.

### 3.13 RECORD DRAWINGS

- A. The CxA shall review the as built contract documents to verify incorporation of both design changes and as built construction details. Discrepancies noted shall be corrected by the appropriate party.

### 3.14 EXCLUSIONS

- A. Responsibility for construction means and methods: The CxA is not responsible for construction means & methods, job safety or any construction management functions on the job site.
- B. Hands on work by the CxA: The Trade Contractors shall provide all services requiring tools or the use of tools to startup, test, adjust or otherwise bring equipment and systems into a fully operational state. The CxA shall coordinate and observe these procedures (and may make minor adjustments) but shall not perform any construction, field or technician services other than verification of testing, adjusting, balancing and control functions.

END OF SECTION

## SECTION 024119

### SELECTIVE DEMOLITION AND ALTERATION WORK

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the selective demolition and alteration work as shown on the drawings and/or specified herein, including but not limited to the following:
  - 1. Alterations, selective demolition and removals as noted on drawings and as required to accommodate new construction.
  - 2. Removal of debris.
  - 3. Protection of existing building and spaces to remain, and shoring of the structure as required for structural integrity and personal safety.
  - 4. Protection of existing curbs and sidewalks.
  - 5. Temporary coverage passageways.
  - 6. Alterations, selective demolition and removals of exterior facade where noted.
  - 7. Patching and refinishing of existing surfaces damaged as a result of this work.
  - 8. Protection.

##### 1.3 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. The Contractor shall comply with the requirements of all applicable Federal, State and local safety and health regulations regarding the demolition of structures including ANSI/NFPD 241-Building Construction and Demolition Operations.

- C. The Contractor shall be responsible for any damage to any adjacent structures or buildings to remain.
- D. Qualifications: Qualifications of Contractor for work of this Section shall not be less than ten (10) years of field experience in work of this nature.
- E. Professional Engineering: The Contractor shall retain the services of a Professional Engineer licensed in the State of New York, who shall design and supervise installation of all underpinning and shoring.

#### 1.4 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. General Contractor Work Allowance - Section 028013.
- F. Specifications for Abatement of Asbestos-Containing Materials - Section 028213.
- G. Alteration and removal requirements for mechanical and electrical work - Mechanical and Electrical Sections.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications.
  - 2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Schedule of Demolition Operations: Submit demolition procedures and operational sequence for Commissioner's review prior to start of work. Submit a written request to Commissioner well in advance of executing any cutting or alteration which affects:
1. The work of tying in or connecting to operational systems of the building, including electrical, mechanical and security systems.
  2. The work of the City of New York or any separate Contractor.
  3. The structural value or integrity of any element of the project or of adjacent structures.
  4. The integrity or effectiveness of weather-exposed and moisture-resistant elements or systems.
  5. The efficiency, operational life, maintenance, or safety of operational elements or systems.
- C. Notice of Differing Conditions: Submit a written notification if, during the work of demolition and cutting, conditions are discovered which significantly vary from those shown on the drawings. Do not commence work until approval of Commissioner.
- D. Shop Drawings: Submit the following prior to starting work:
1. Submit for Commissioner's information shop drawings indicating location and typical construction details of temporary dustproof and weatherproof partitions.
  2. Submit drawings of temporary structural shoring, bracing, framing or support, for the information of the Commissioner. Such drawings will be reviewed by the Structural Engineer for the effects of such temporary members on the structural elements to remain. These drawings shall include the reason for such temporary members, the location, the direction and magnitude of design reaction forces on existing structure, and details showing how these reaction forces will be applied to the existing structure.
    - a. Shop drawings shall be submitted with the Seal of the P.E. engaged by Contractor; P.E. must be licensed in the State of New York.
    - b. The Commissioner will receive acknowledgment for concepts shown. Such acknowledgments shall be of the concept only and not of actual capacities or structural design and shall not in any way diminish or limit the Contractor's responsibility for the quality and performance of the work and for protecting existing structures and facilities.

#### 1.6 SPECIAL PRECAUTION

- A. Hazardous materials may be encountered during demolition operations including asbestos; comply with applicable regulations, laws, and ordinances concerning

removal, handling, and protection against exposure or environmental pollution. Refer to "Specifications for Abatement of Asbestos-Containing Materials" included herein.

1.7 JOB CONDITIONS

A. Condition of Structure

1. The Contractor for the work of this Section shall be held to have visited the site, examined the premises, determined for himself the existing conditions, character of equipment and facilities needed for the performance of the work, and all matters which may in any way affect the work before submitting a bid.
  - a. Information regarding existing construction or conditions is based on available record drawings which may or may not truly reflect existing conditions. Such information is included on the assumption that it may be of interest to the Contractor, but the Commissioner, the City of New York and their consultants do not assume responsibility for its accuracy or completeness.
  - b. Notify the Commissioner if, during the course of demolition, conditions are discovered which significantly vary from those shown on the drawings. Do not proceed until authorized by Commissioner.
2. The Contractor shall accept the condition of the site and structures as found. The Commissioner and the City of New York assume no responsibility for condition of site or structures nor the continuation of the condition existing at time of bidding or thereafter.

B. Areas of building to be demolished or altered will be vacated and discontinued in use prior to the start of the work.

1. Surrounding areas of the building shall remain operational by the City of New York.

C. Partial Removal

1. Items of savable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed.
2. Storage or sale of removed items on the site will not be permitted.

D. Explosives: The use of explosives will not be permitted.

E. Traffic

1. Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.

2. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

F. Utilities

1. Refer to Division 22 and 26 of the specifications for special requirements concerning utilities and services.
2. Maintain any existing utilities required to remain; keep in service and protect against damage during demolition operations.
3. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities.
4. Disconnect and seal any abandoned utilities before starting demolition operations. Coordinate all work with local utility companies having jurisdiction.

1.8 SCHEDULING

- A. Before commencing any alteration or demolition work, submit for review by the Commissioner, and approval of the City of New York, a schedule showing the commencement, the order, and the completion dates for the various parts of this work.
- B. Before starting any work relating to existing utilities (electrical, sewer, water, heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service to the structures to remain, notify the Commissioner and the City of New York 7 days in advance and obtain the City of New York's approval in writing before proceeding with this phase of the work.

PART 2 PRODUCTS

Refer to Part 3 - Execution, for Product Requirements

PART 3 EXECUTION

3.1 PROTECTION

- A. Take full precautions to protect workmen, passersby or any other persons from falling debris and other hazards of demolition operations.
- B. Execute demolition work to insure protection of existing portions of building to remain against damages which might occur from falling debris or other cause. Do not interfere with use of adjacent occupied buildings and areas. Maintain free, safe passage to and from occupied adjacent buildings.
- C. Materials Placement: Do not load structure with weight that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished

surfaces adjacent to and/or supported by the existing structure, except portions being removed.

- D. Construction Operations: Do not employ any construction operation, equipment or vehicles that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished surfaces adjacent to and/or supported by the existing structure, except portions being removed.
- E. Take precautions to guard against movement, settlement, damage, or collapse of any part of building, sidewalks, adjacent property or street passages; be liable for any such movement, settlement or collapse. If such damage does accidentally occur, Contractor shall repair promptly at no cost to the City of New York.
- F. Provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the work and property at all times, including Saturdays, Sundays, and holidays.
- G. Be responsible for any and all damages which may arise or occur to any party whatsoever by reason of the neglect in providing proper lights, guards, barriers, or any other safeguards to prevent damage to property, life and limb.
- H. Make such explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. Give particular attention to shoring and bracing requirements so as to prevent any damage to existing construction.
  - 1. Provide interior and exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain. The Contractor's Professional Engineer shall advise on bracing, shoring, underpinning, or other structural requirements. The Contractor shall bear all responsibility for prevention of movement or other structural fault.
  - 2. The Contractor shall restore, by repair or otherwise, the portions of structure or their contents altered by the Contractor in furtherance of his underpinning and support operations. Restoration shall be completed to the conditions which existed prior to the start of the work. Any damage caused by inadequate support shall also be restored by the Contractor at no cost to the City of New York.
- I. Provide, erect and maintain catch platforms, lights, barriers, weather protection, warning signs, and other items as required for proper protection of the workmen engaged in demolition and alteration operations, occupants of the building, public and adjacent property. Any damage caused by the Contractor's operations shall be promptly repaired by the Contractor at no cost to the City of New York.
- J. Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal, and new work are being done, connections made, materials handled, or equipment moved.

- K. Take necessary precautions to prevent dust and dirt from rising. Protect unaltered portions of the existing building affected by the operations under this Section by dustproof partitions and other adequate means.
- L. Provide adequate fire protection in accordance with local Fire Department requirements.
- M. Do not close or obstruct walkways, passageways, or stairways. Do not store or place materials in passageways, stairs, or other means of egress. Conduct operations with minimum traffic interference.
- N. Be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.
- O. Erect temporary covered passageways at street level as required by authorities having jurisdiction.
- P. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the City of New York.
- Q. Provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.

### 3.2 INSPECTION

- A. Verify that areas of demolition work are protected and temporary dustproof partitions have been installed.
- B. Verify that construction to be removed is not load bearing or has been properly braced, framed or supported.
- C. Inspect existing conditions of the project, including elements subject to damage or to movement during demolition and cutting.
- D. After uncovering work, inspect the conditions affecting the installation or performance of the work.
  - 1. Report differing or questionable conditions to the Commissioner in writing; do not proceed with the work until the Commissioner has provided further instructions.

### 3.3 PREPARATION

- A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work
- B. Provide devices and methods to protect other portions of the project from damage.
- C. Pollution Controls

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.
  - a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
2. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of the work.
3. Provide drainage for temporary water use.

### 3.4 DEMOLITION AND CUTTING

- A. Selectively demolish existing construction in conformance with the drawings and these specifications.
  1. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surface to receive installation of work by others and patching of finish surfaces.
  2. Do all cutting or removal so as to leave neat, true, plumb and square edges, at edges to remain. Use carborundum or diamond saw equipment for cutting masonry, concrete and stone work, where edges or surfaces are to remain.
  3. Do not cut or remove construction which might weaken or impair the structural integrity or strength of the structural framing or support systems which are to remain.
  4. Demolish and remove materials as shown on the drawings without damage to the remaining parts of the structure or mechanical/electrical/utility systems.
  5. Remove materials so as to not impose excessive loads in supporting walls, floors or framing and so as not to damage remaining undemolished portions of the structure.
  6. Where portions of structures are to be removed, remaining portions shall be protected from damage and prepared to fit new construction. Damage to portions of structures to remain shall be repaired.
  7. Reinforcing steel in existing structures shall be left in place, cleaned and aligned to provide tie with new work.
  8. Existing waterproofing systems and flashings shall be carefully exposed and protected to maintain workable conditions of fitting new work with existing construction.
  9. Proceed with demolition in a systematic manner.
  10. Demolish concrete and masonry in small sections.

B. Shoring

1. Design, provide, erect and maintain necessary temporary shoring, bracing, framing, or support where load bearing structural or supporting members are removed or weakened by cuts or openings or are subject to damage from demolition operations, and otherwise as required for safety or to protect finish surfaces from damage.
2. Construction and adequacy of the shoring shall be the entire responsibility of the Contractor. Any damage caused by the inadequacy of the shoring or other support shall be the responsibility of the Contractor to remedy at no additional expense to the City of New York.
3. Shoring and bracing shall remain until new structural framing and/or supports are installed. Coordinate operations fully with other trades.
4. Be ready at any time to promptly provide, add to, or strengthen temporary shoring, bracing, or support for existing work, in case existing construction begins to show signs of structural stress.

3.5 WORKMANSHIP STANDARDS FOR ALTERATION AND REMOVAL WORK

- A. Cut, remove, alter, temporarily remove and replace, or relocate existing work as required for performance of the work. Perform such work required with due care, including shoring and bracing.
- B. Coordinate patching involving the various trades whether or not specifically mentioned in the respective specification Sections.
- C. Materials or items demolished and not designated to become the property of the City of New York or to be reinstalled shall become the property of the Contractor and shall be removed from the City of New York's property.
- D. Execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the adjacent buildings.
- E. In general, demolish masonry in small sections. Where necessary to prevent collapse of any construction, install temporary shores, struts, or bracing.
- F. Materials to be removed by existing elevators shall be put in enclosed containers.
- G. Where existing equipment and/or fixtures are indicated to be reused, repair such equipment and/or fixtures and refinish to put in perfect working order. Refinish as directed.
- H. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.
- I. Confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. Cut and fold back existing roofing. Cut and remove insulation and related items. Provide temporary weathertight protection as

required until new roofing and flashings are installed. Consult the City of New York to ascertain if existing guarantee bonds are in force and execute the work so as not to invalidate such bonds.

- J. Where utilities are removed, relocated or abandoned, cap, valve, plug, or by-pass to make complete and working installation.
- K. Restore existing pipe and duct coverings damaged by work under this Contract to original undamaged condition.
- L. Immediately restore to service and repair any damage caused by Contractor's workmen to existing pipe and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems which are not scheduled for discontinuance or abandonment.
- M. Upon completion of contract, deliver work complete. Damage that may be caused by Contractor or Contractor's workmen to existing structures designated to remain, grounds, and utilities shall be repaired by Contractor and left in as good condition as existed prior to damaging.
- N. Restore finish work of floors, walls, and ceilings remaining in place but damaged or defaced because of demolition or alteration work to condition equal that which existed at beginning of work under this Contract.
- O. Where alteration or removals expose damaged or unfinished surfaces or materials, refinish such surfaces or materials, or remove them and provide new or salvaged materials to make continuous surfaces uniform.
- P. Perform new work and restore and refinish existing work in conformance with applicable requirements of the specifications, except as follows:
  - 1. Materials for use in repair of existing surfaces, but not otherwise specified, shall conform to the highest standards of the trade involved, and be in accordance with approved industry standards, and shall be as required to match existing surfaces.
  - 2. Workmanship for repair of existing materials shall, unless otherwise specified, be equal to similar workmanship existing in or adjacent to the space where the work is being done.
  - 3. Installation of salvaged items where no similar items exist shall be done in accordance with the highest standards of the trade involved and in accordance with approved shop drawings.
- Q. Materials or items designated to become the property of the City of New York shall be as shown on the drawings. Remove such items with care and store them in a location at the site to be designated by the City of New York.
- R. Materials or items designated to be reinstalled shall be as shown on the drawings. Remove such items with care under the supervision of the trade responsible for reinstallation; protect and store until required. Replace materials or items damaged in their removal with similar new material.

- S. The existing building shall not be used as a work shop. Neither shall the furnishings or equipment in any room be used as work benches. Should any damage occur during the progress of the work to any furniture, fixtures, equipment, or appurtenances therein, such damage shall be repaired, replaced or made good by the Contractor without extra cost to the City of New York.
- T. Where removing existing floor finish and base, remove all adhesive and leave floors and walls smooth and flush, ready to receive new finish.
- U. Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease and loose paint before refinishing.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

#### A. General

1. Remove from the site debris, rubbish and other materials resulting from work of this Section.
2. Burning of removed materials from demolished structures will not be permitted on the site.

- B. Removal: Transport materials removed from demolished structures and legally dispose of off site. Pay any and all fees associated with disposal work. Leave the site in an orderly condition to the approval of the Commissioner.

### 3.7 CLEANING UP

- A. Remove debris at the end of each work day. Maintain existing premises in a neat and clean condition.

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**SECTION 028013 – GENERAL CONTRACTOR WORK**  
**ALLOWANCE FOR INCIDENTAL ASBESTOS ABATEMENT**

**1.01 SCOPE**

- A. The "General Conditions" apply to the work of this Section.
- B. The Contractor shall remove asbestos containing materials as needed to perform the other work of this Contract when discovered during the course of work. When required, the Contractor shall replace the ACM with non-asbestos containing materials. An allowance **\$30,000.00** for the **General Contractor** is herein established for this incidental work when so ordered and authorized by the Commissioner through a written Work Order Letter.
- C. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE RULES AND REGULATIONS OF THE ASBESTOS CONTROL PROGRAM AS PROMULGATED BY TITLE 15 CHAPTER I OF RCNY AND NEW YORK STATE DEPARTMENT OF LABOR INDUSTRIAL CODE RULE 56 CITED AS 12 NYCRR, PART 56 WHICHEVER IS MORE STRINGENT AS PER LATEST AMENDMENTS TO THESE LAWS AND AS MODIFIED HEREIN BY THESE SPECIFICATIONS.
- D. ALL DISPOSAL OF ASBESTOS CONTAMINATED MATERIAL SHALL BE PER LOCAL LAW 70/85.
- E. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT CERTAIN METHODS OF ASBESTOS ABATEMENT ARE PROTECTED BY PATENTS. TO DATE, PATENTS HAVE BEEN ISSUED WITH RESPECT TO "NEGATIVE PRESSURE ENCLOSURE" OR "NEGATIVE-AIR" OR "REDUCED PRESSURE" AND "GLOVE BAG".
- F. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR AND SHALL HOLD THE DEPARTMENT OF DESIGN AND CONSTRUCTION AND THE CITY HARMLESS FROM ANY AND ALL DAMAGES, LOSSES AND EXPENSES RESULTING FROM ANY INFRINGEMENT BY THE CONTRACTOR OF ANY PATENT, INCLUDING BUT NOT LIMITED TO THE PATENTS DESCRIBED ABOVE, USED BY THE CONTRACTOR DURING PERFORMANCE OF THIS AGREEMENT.
- G. "Asbestos" shall mean any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crocidolite (riebeckite), tremolite, anthrophyllite and actinolite.
- H. Prior to starting, the Contractor must notify the Commissioner of the Department of Design and Construction if he/she anticipates any difficulty in performing the

GENERAL CONTRACTOR WORK ALLOWANCE FOR INCIDENTAL ASBESTOS ABATEMENT

Work as directed in the Work Order Letter and as required by these Specifications. The Contractor is responsible to prepare and submit all filings, notifications, etc. required by all City, State and Federal regulatory agencies having jurisdiction.

The Contractor is responsible for submitting the Asbestos Project Notification Form (ACP-7 Form) to the Department of Environmental Protection, Asbestos Control Program one week prior to abatement work as per Title 15, Chapter I of RCNY.

The Contractor is responsible for preparing, and submitting Asbestos Variance Application (ACP-9). If a Variance is required the Contractor is responsible to retain and NYSDOL Asbestos Project Designer as defined in Title 15, Chapter 1 of the RCNY to prepare and submit the variance as required.

The Contractor is responsible for preparing and submitting an Asbestos Abatement Permit and/or Work Place Safety Plans (WPSP) that may be required for the completion of the Contract or incidental work. If such plans are required the Contractor is responsible to retain and NYS Licensed Design Professional as defined in Title 15, Chapter 1 of the RCNY to prepare and submit such plans as required.

The Contractor is responsible for the submission of all required documents to the NYCDEP to acquire the appropriate Asbestos Project Conditional Closeout (ACP-20) and/or Asbestos Project Completion Forms (ACP-21) on a timely basis for the completion of the incidental work encountered under this contract.

The Contractor will be required to attend an on-site job meeting with the Construction Project Manager prior to the start of work to examine conditions and plan the sequence of operations, etc.

The Contractor shall have a NYSDOL/NYCDEP Asbestos Supervisor onsite to oversee the work and conduct a final visual inspection as required by both Title 15, Chapter 1 of the RCNY and NYSDOL Industrial Code Rule 56.

- I. All work shall be done during regular working hours unless the Contractor requests authorization to work in other than regular working hours and such authorization is granted by the Commissioner. (Regular work hours are those hours during which any given facility, in which work is to be done, is customarily open and functioning, normally between the hours of 8:00 A.M. and 4:00 P.M. Monday - Friday.) If such work schedule is authorized by the Commissioner, the work shall be done at no additional cost to the City.
- J. The Commissioner may order that work be done in other than regular working hours as herein by defined and this order may require the Contractor to pay premium or overtime wages to complete the work. If the Commissioner orders work in other than regular working hours, the Contractor shall multiply the unit

price for that portion of the work requiring premium wages by 1.50 when computing payment in accordance with Paragraph 1.10. All requests for premium payment must be supported by certified payroll sheets and field sheets approved by the Construction Project Manager.

## 1.02 QUALIFICATIONS OF CONTRACTOR

- A. General: The special experience requirements set forth in Section B below apply to the bidder for this contract.
1. Evaluation: Compliance with the special experience requirements will be evaluated at the time of the bid. The bidder is advised that failure to meet such special experience requirements will result in the rejection of the bid as non-responsive. Compliance with the experience requirements set forth herein will be determined solely by the City.
  2. Compliance by the Bidder as an Entity: Compliance with the special experience requirements must be demonstrated by the BIDDER ITSELF, i.e., the actual entity submitting the bid. The bidder itself must have been in existence as the same entity for the three year period prior to the bid opening. During such period, the bidding entity itself must have achieved compliance with the special experience requirements. The bidding entity may not use or rely on the experience or credentials of any other entity, regardless of any relationship such other entity may have to the bidder.
- B. Requirements: The bidder must demonstrate compliance with the special experience requirements set forth in subparagraphs (1) through (5) below. The bidder must, as part of its bid, submit documentation demonstrating compliance with all listed requirements. Such documentation shall include without limitation, all required licenses, certificates, and documentation.
1. The bidder must, whether an individual, corporation, partnership, joint venture or other legal entity, must demonstrate for the three year period prior to the bid opening, that it has been licensed by the New York State Department of Labor, as an "Asbestos Contractor".
  2. The bidder must, for the three year period prior to the bid opening, have been in the business of providing asbestos abatement services as a routine part of its daily operations.
  3. The bidder proposing to do asbestos abatement work must be thoroughly experienced in such work and must provide evidence of having successfully performed and completed in a timely fashion at least five(5) asbestos abatement projects of similar size and complexity. The aggregate cost of these projects must be at least \$500,000.00 in each of the three years.

4. For each project submitted to meet the experience requirements set forth above, the bidder must submit the following information for the project; name and location of the project; name title and telephone number of the owner or the owner's representative who is familiar with the bidder's work, brief description of the work completed as a prime or sub-contractor; amount of contract or subcontract and the date of completion.
  5. The bidder must demonstrate that it has the financial resources, supervisory personnel and equipment necessary to carry out the work and to comply with the required performance schedule, taking into consideration other business commitments. The bidder must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the requisite capacity to perform the required services of this contract.
- C. Insurance Requirements: The asbestos contractor must provide asbestos liability insurance in the following amount: 1 million dollars per occurrence, 2 million dollars aggregate (combined single limit). The City of New York shall be named as an additional insured on such insurance policy.
- D. Throughout the specifications, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics thereof.

### **1.03 WORK ORDER LETTERS**

Work Order Letters will be issued throughout the Contract period, and as required to cover the services requested.

### **1.04 ESTIMATED QUANTITY**

The Department of Design and Construction reserves the right during the term of this Contract to determine the number of Work Order Letters and the Scope of Work to be included therein, and shall not be deemed to be limited by the estimate amount of the allowance nor does this Contract guarantee or obligate the Department of Design and Construction to issue a required number of Work Order Letters. The Contractor is cautioned that payment will not be made for any work that is not authorized by the Department of Design and Construction.

When work is ordered, the Contractor will visit the subject location within one (1) working day of notification to ascertain actual work required. If the project is identified as being "urgent", then work shall commence no later than 48 hours from the time of notification. In this event, the contractor shall immediately notify when applicable EPA NESHAPS Coordinator, NYSDOL Asbestos Control Bureau and NYCDEP Asbestos Control Program of start of the work and file the necessary Asbestos Notifications and Variance Applications with the NYCDEP, NYSDOL and USEPA.

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In the event that the project is not classified as "urgent" the Contractor shall notify the EPA NESHAPS Coordinator, NYSDOL and NYCDEP by submitting the requisite asbestos project notification forms, postmarked 10 days before activity begins if 260 linear feet or more and/or 160 square feet or more of asbestos containing material will be disturbed.

The following information must be included in the notification:

- A. Name and address of building City or operator;
- B. Project description:
  - 1. Size - square feet, number of linear feet, etc;
  - 2. Age - date of construction and renovations (if known);
  - 3. Use - i.e., office, school, industrial, etc.
  - 4. Scope - repair, demolition, cleaning, etc.
- C. Amount of asbestos involved in work and an explanation of techniques used to determine the amount;
- D. Building location/address, including Block and Lot numbers;
- E. Work schedule including the starting and completion dates;
- F. Abatement methods to be employed;
- G. Procedures for removal of asbestos-containing material;
- H. Name, title and authority of governmental representative sponsoring project.

**1.05 WORK INCLUDED IN UNIT PRICE**

An allowance as identified in the Bid booklet has been established for any additional work in areas that contain asbestos that is exposed during construction. From this allowance, the Contractor will be paid a basic unit price of **\$20.00** per square feet for the removal and disposal of asbestos containing material and replacement of the same with non-asbestos containing materials.

Unit price shall include all costs necessary to do the work of this Contract, including but not limited to: labor, materials, equipment, utilities, disposal, insurance, overhead and profit.

**1.06 AIR MONITORING - CONTRACTOR**

- A. "Air Sampling" shall mean the process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400 or the provisional transmission electron microscopy methods developed by the USEPA and/or National Institute of Standard and Technology which are utilized for lower detectability and specific fiber identification.
- B. Air monitoring of Contractor's personnel will be performed in conformance with OSHA requirements, (All costs associated with this work are deemed included in the unit price.).
- C. Qualifications of Testing Laboratory:

The industrial hygiene laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory identification number shall be submitted and approved by the City. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).

Note: Work area air testing and analysis before, during and upon completion of work (clearance testing) will be performed by a Third Party Air Monitor under separate Contract with the City.

**1.07 THIRD PARTY MONITORING AND LABORATORY**

- A. The NYCDDC, at its own expense, will employ the services of an independent Third Party Air Monitoring Firm and Laboratory. The Third Party Air Monitor will perform air sampling activities and project monitoring at the Work Site.
- B. The Laboratory will perform analysis of air samples utilizing Phase Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM).
- C. The Third Party Air Monitoring Firm and the designated Project Monitor shall have access to all areas of the asbestos removal project at all times and shall continuously inspect and monitor the performance of the Contractor to verify that said performance complies with this Specification. The Third-Party Air Monitor shall be on site throughout the entire abatement operation.
- D. The NYCDDC will be responsible for costs incurred with the Third Party Air Monitoring Firm and laboratory work. Any subsequent additional testing required due to limits exceeded during initial testing shall be paid for by the Contractor.

1.08 PAYMENT REQUEST

- A. Request for payment shall be submitted to the Commissioner, Department of Design and Construction not more often than every 30 days that this Contract is in force.
- B. Each payment request shall include copies of all Work Order Letters completed in that month. Each Work Order Letter shall be listed separately.
- C. The following information shall be included for each Work Order Letter:
  - 1. Description of work performed.
  - 2. Linear footage and pipe sizes involved.
  - 3. Square footage for boiler & breaching insulation removed.
  - 4. Square footage of non pipe and boiler areas removed, patched, enclosed, sealed, or painted.
  - 5. Square footage of encapsulation, sealing, patching, painting involved.
  - 6. Total cost associated with compliance with Work Order Letter.
  - 7. Architectural, Electrical, HVAC, Plumbing, etc. work incidental to the Asbestos Abatement Work.
  - 8. A certified copy (in form 4312-39) to the Comptroller or Financial Officer of the New York City to the effect that the financial statement is true.
  - 9. A signed copy (in form 6506q-6) of certificate of compliance with non-discriminatory provisions of the Contract.
  - 10. Attach a copy of valid workmen compensation insurance.
  - 11. Valid asbestos insurance per occurrence.
  - 12. General liability insurance when required.
- D. Each payment request shall include a grand total for all work completed that billing period, the landfill waste manifests and a copy of waste transporter permit. The Department of Design and Construction will inspect the work performed, review the cost and approve or disapprove requests for payment.
- E. EXPOSURE LOG: With this final payment, the Contractor shall submit a listing of the names and social security numbers of all employees actively engaged in the abatement work of this Contract. This list shall include a summary showing each

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part of the abatement work in which the employee was engaged and the dates thereof.

**1.09 QUANTITY CALCULATIONS**

In order to determine the square footage involved for the various pipe sizes of pipe insulation that might be encountered, the following table is to be used.

<u>PIPE INSULATION SIZE O.D.</u>	<u>PIPE SIZE O.D.</u>	<u>SQUARE FOOTAGE PER LINEAR FOOT</u>
2-1/2"	1/2"	0.65
2-3/4"	3/4"	0.72
3"	1"	0.79
3-1/4"	1-1/4"	0.85
3-1/2"	1-1/2"	0.92
4"	2"	1.05
4-1/2"	2-1/2"	1.18
5"	3"	1.31
6"	3-1/4"	1.57
7"	3-1/2"	1.83
8"	4"	2.09
9"	5"	2.36
10"	6"	2.62
12"	8"	3.14
14"	10"	3.67
16"	12"	4.19
18"	14"	4.71

**1.10 METHOD OF PAYMENT**

Payment shall be made in accordance with Items A through R below. Payment shall be calculated based on the actual quantity of the item performed by the contractor, times the unit price specified below. Credits may apply to certain times, as specified below.

- A. **REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING PIPE INSULATION:** Actual linear footage, multiplied by the square footage factor listed for the respective pipe size in Section 1.09, multiplied by the unit price in Section 1.05.

EXAMPLE: 100 lin.ft. of 1/2" pipe and 100 lin.ft. of 6" pipe, including elbows, tees. Flanges, etc.

$$100 \times 0.65 = 65 \text{ sq.ft.} \quad 65 \times \text{unit price} = \text{Payment}$$

$$100 \times 2.62 = 262 \text{ sq.ft.} \quad 262 \times \text{unit price} = \text{Payment}$$

- B. **REMOVAL, DISPOSAL AND R  PLACEMENT OF BOILER INSULATION:** (all types including Silicate Block and including the removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.

EXAMPLE: Item B. removal and replacement of 1000 S.F. of boiler insulation (incl. Silicate block)

1000 S.F. X (1.5) X the Unit Price = Payment

- C. **REMOVAL, DISPOSAL AND REPLACEMENT OF TANK INSULATION:** (all types including removal/replacement of metal jacketing) Payment shall be made at 1.5 times the unit price per square foot.
- D. **REMOVAL, DISPOSAL AND REPLACEMENT OF BOILER UPTAKE, & BREACHING INSULATION:** (all types including stiffening angles and wire lath) Payment shall be made at 2.0 times the unit price per square foot.
- E. **REMOVAL, DISPOSAL AND REPLACEMENT OF DUCT INSULATION:** Payment shall be made at 1.0 times the unit price per square foot.
- F. **REMOVAL, DISPOSAL AND REPLACEMENT OF SOFT ASBESTOS CONTAINING MATERIAL:** (Including sprayed-on fire proofing and sound proofing) Payment shall be made at 1.0 times the unit price per square foot of surface area. Area of irregular surfaces must be calculated and confirmed with DDC representative.
- G. **ACOUSTIC PLASTER REPAIR AND/OR ENCAPSULATION:** Payment shall be made at 0.5 times the unit price per square foot.
- H. **PATCHING OR REPAIR** of items listed in A through F will be paid at 0.33 times the unit price per square foot.
- I. **REMOVAL, DISPOSAL AND REPLACEMENT OF WATERPROOFING ASBESTOS CONTAINING MATERIAL:** (including friable and non-friable waterproofing material from interior and exterior walls, floors, foundations, penetrations, louvers, vents and openings other than windows, doors and skylights) Payment shall be made at 0.5 times the unit price per square foot.
- J. **REMOVAL, DISPOSAL AND REPLACEMENT OF ASBESTOS CONTAINING ELECTRICAL WIRING INSULATION:** (including friable and non-friable wiring insulation) Payment shall be made at 0.33 times the unit price per square foot.
- K. **PAINTING:** Payment shall be made at 0.05 times the unit price per square foot.

- L. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING PLASTER:** from ceilings and walls, including any wire lath and disposal as asbestos containing waste. Payment shall be made at 0.80 times the unit price per square foot.
- M. **REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING FLOOR TILES, CEILING TILES, TRANSITE PANELS:** (including any adhesive, glue, mastic and/or underlayment) and disposal as asbestos containing waste. Payment shall be made at 0.40 times the unit price per square foot. If multiple layers are discovered, each additional layer shall be paid at 0.20 times the unit price per square foot.
- N. **ADDITIONAL CLEAN UP/HOUSEKEEPING OF WORK AREA:** (excluding pre-cleaning of work area required by regulations) HEPA vacuuming and wet cleaning of asbestos contaminated surface. Payment shall be made at 0.20 times the unit price per square foot. When GLOVE BAG is employed to remove ACM, cost of HEPA vacuuming and wet cleaning of floor area up to 3 feet on each side of glove-bag shall be included in unit price and no extra payment will be made.
- O. **REMOVAL, DISPOSAL OF ASBESTOS-CONTAINING ROOFING MATERIAL:** including mastic, flashing and sealant compound and provide temporary asbestos-free roof covering consisting of one layer of rolled roofing paper sealed with asphaltic roofing compound. Payment shall be made at 0.8 times the unit price per square foot. Credit at a rate of 0.33 times the unit price will be taken for each square foot of temporary roof covering which the Contractor is directed not to install.
- P. **PICK-UP AND DISPOSAL OF GROSS DEBRIS:** (excluding any waste generated from abatement under Item A-R) at a rate of \$150 per cubic yard for asbestos contaminated waste and \$75 per cubic yard for non-asbestos contaminated waste. This cost includes all labor and material cost associated with work.
- Q. **REMOVAL OF ASBESTOS-CONTAINING BRICK, BLOCK, MORTAR, CEMENT OR CONCRETE:** along with all surfacing materials including wire lath and/or other supporting structures and disposal as ACM waste. Payment shall be made at a rate of \$25.00 per cubic foot of material removed.
- R. **REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING WINDOW/DOOR CAULKING:** including friable and non-friable caulking, weather-stripping, glazing, sealants or other waterproofing materials applied to windows, doors, skylights, etc. Payment shall be made at the rate of \$400.00 per opening regardless of size or configuration. This cost includes labor, consumable materials, set-up/breakdown, removal and disposal, as required.

**Note 1: CREDIT:** For items listed in A through F, a credit at a rate of 0.33 times the unit price, times the respective multiplier (for each item) will be taken for each square foot of insulation which the contractor is not directed to reapply.

**Note 2: MINIMUM PAYMENT:** The minimum payment per call at any individual job sites or various job sites during the same day will be eight hundred dollars (\$800.00).

**Note 3:** All payments shall be made as described in paragraph 1.10 herein.

**Note 4: WORKING HIGHER THAN 12 EET ABOVE FLOOR LEVEL OR WORK REQUIRING COMPLEX SCAFFOLDING OR CONSTRUCTION WORK PLATFORMS:** Provisions are made in this Contract to compensate the Contractor for work performed in locations that are difficult to access due to work at elevations that are significantly higher than the normal work level. The unit price for these items will be paid at 1.20 times the unit price described in Paragraphs 1.10, A through R for those portions of the work that are more than twelve (12) feet above the grade for that would be judged as the normal working level.

#### 1.11 GUARANTEE

- A. Work performed in compliance with each Work Order Letter shall be guaranteed for a period of one year from the date the completed work is accepted by the Department of Design and Construction.
- B. The Contractor shall not be held liable for the guarantee where the repair required under the guarantee is a result of obvious abuse or vandalism as determined by the Commissioner.
- C. The Commissioner of The Department of Design and Construction will notify the Contractor in writing regarding defects in work under the guarantee.

#### 1.12 WORK BY OTHERS

The Department of Design and Construction reserves the right during the term of this Contract to have work performed on asbestos abatement projects by other Contractors and/or their own shop mechanics as warranted by field or project conditions.

#### 1.13 OCCUPANCY OF SITE NOT EXCLUSIVE

Attention is specifically drawn to the fact that Contractors, performing the work of other Contracts, may be brought upon any of the work sites of this Contract. Therefore, the Contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other Contractors who may be brought upon any site of the work of this Contract. This paragraph applies to those areas outside the regulated Work Area as defined by Title 15, Chapter I of RCNY.

1.14 SUBMITTALS

A. Pre-Construction Submittals:

1. Attend a pre-construction meeting scheduled by the City of New York Department of Design and Construction. This meeting shall also be attended by a designated representative of the City of New York third party air monitoring firm, facility manager and the Construction Project Manager. At this meeting, the Contractor shall present three copies of the following items:
  - a. Contractor's scope of work, work plan and schedule.
  - b. Asbestos project notifications, approved variances and plans to Government Agencies.
  - c. Copies of Permits, clearance and licenses if required.
  - d. Schedules: the Contractor shall provide to the Construction Project Manager a copy of the following schedules for approval. Once approved, schedules shall be maintained and updated as received. Contractor shall post a copy of all schedules at the site:
    - (1) A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area preparation, demolition, gross removal, fine cleaning, encapsulation, inspections, clearance monitoring, and phase of refinishing and final inspections. The schedule shall be updated biweekly, at a minimum.
    - (2) A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per day, and total days to be worked.
    - (3) Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation.
  - e. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number to nearest hospital) and procedures to be used for access by medical personnel (examples: first aid squad and physician). NOTE: Necessary Emergency Procedures Shall Take Priority Over All Other Requirements of These Specifications.

- f. Material Safety Data Sheets (MSDS) for encapsulants, sealants, firestopping foam, cleaners/disinfectants, spray adhesive and any and all potentially hazardous materials that may be employed on the project. No work involving the aforementioned will be allowed to proceed until MSDS are reviewed.
- g. Worker Training and Medical Surveillance: Contractor shall submit a list of the persons who will be employed by him and his Subcontractors in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
- h. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.
  - (1) The Contractor shall provide a permanently bound log book of minimum 8-1/2" x 11" size at the entrance to the Worker and Waste Decontamination enclosure system as hereinafter specified. Log book shall contain on title page the project name, name, address and phone number of the Abatement Contractor; name, address and phone number of Contractor and City's third party air monitoring firm; emergency numbers including, but not limited to local Fire/Rescue Department. Log book shall contain a list of personnel approved for entry into the Work Area.
  - (2) All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted. Any significant events occurring during the abatement project shall be entered into the log. Upon completion of the job, the Contractor shall submit the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.
- i. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of ACM, understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.

B. During Construction Submittals:

- 1. Security and safety logs showing names of person entering workspace, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.

GENERAL CONTRACTOR WORK ALLOWANCE FOR INCIDENTAL ASBESTOS ABATEMENT

2. Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project Manager.
3. Floor plans indicating Contractor's current work progress shall be submitted for review by the Construction Project Manager.
4. All Contractors' air monitoring and inspection results.

C. Project Closeout Submittals:

Upon completion of the project and as a condition of acceptance, the Contractor shall present two copies of the following items, bound and indexed:

1. Lien Waivers from Contractor, Sub-Contractors and Suppliers,
2. Daily OSHA air monitoring results,
3. All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,
4. Field Sign-In/Sign-Out Logs for every shift,
5. Copies of all Building Department Forms and Permits,
6. A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations,
7. All Warranties as stated in the Specifications,
  - a. Fully executed disposal certificates and transportation manifest.
8. Project Record: The contractor shall maintain a project record for all small and large asbestos projects. During the project, the project record shall be kept on site at all times. Upon completion of the project, the project record shall be maintained by the building owner. The project record shall be submitted to DDC as part of the close out documents. The project record shall consist of:
  - a. Copies of licenses of all contractors involved in the project;
  - b. Copies of NYCDEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;

- c. Copies of all project notifications and reports filed with NYCDEP, NYSDOL and USEPA for the project, with any amendments or variances;
- d. Copies of all asbestos abatement permits, including associated approved plans and work place safety plan;
- e. A copy of the air sampling log and all air sampling results;
- f. A copy of the abatement contractor's daily log book;
- g. Copies of all asbestos waste manifests;
- h. A copy of all Project Monitor's Reports (ACP-15).
- i. A copy of each ATR-1 Form completed for the asbestos project (if required).
- j. A copy of each Asbestos Project Conditional Closeout Report (ACP-20) if required.
- k. A copy of the Asbestos Project Completion Form (ACP-21).

#### 1.15 PROTECTION OF FURNITURE AND EQUIPMENT

Cover all furniture and equipment that cannot be removed from Work Areas. Movable furniture and equipment will be removed from Work Areas by the Contractor prior to start of work. At the conclusion of the work (after final air testing), the Contractor will remove all plastic covering on walls, floors, furniture, equipment and reinstall furniture and equipment. He shall remove and store all sheaths, curtains and drapes, and reinstall same following final clean up.

#### 1.16 UTILITIES

##### A. General:

All temporary facilities shall be subject to the approval of the Commissioner. Prior to starting work at any site, locations and/or sketches (if required) of temporary facilities must be submitted to the Construction Project Manager for the required approval.

##### B. Water:

The Department of Design and Construction will furnish all water needed for construction, at no cost to the Contractor in buildings under their jurisdiction. However, it is the responsibility of the Contractor to ensure that hot water is provided for showering in the decontamination unit. The Contractor shall furnish,

install and maintain any needed equipment to meet these requirements at his own expense.

C. Electricity:

The Department of Design and Construction will furnish all electricity needed for construction, at no cost to the Contractor in a building, under their jurisdiction. The Contractor is responsible for routing the electric power to the abatement Work Area.

All temporary lighting and temporary electrical service for Work Area shall be in weatherproof enclosures and be ground fault protected.

- D. In leased spaces, arrangements for water supplies and electricity must be made with the landlord. However, all such arrangements must be made through and are subject to approval of the Department of Design and Construction. Utilities will be provided at no cost to the Contractor. However, it is the Contractor's (or the General Contractor's) responsibility to furnish and install a suitable distribution system to the Work Area. This system will be provided at no cost to the City.

**1.17 FEES**

The Contractor shall be responsible for any and all fees or charges imposed by Local, State or Federal Law, Rule and Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the date of the Bid opening.

**PART 2 – PRODUCTS**

Not used.

**PART 3 – EXECUTION**

Not used.

**END OF SECTION**

## SECTION 028213

### ASBESTOS ABATEMENT

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. The Contract Documents are as defined in the “Agreement”. The General Conditions shall apply to all Work of this Section.
- B. Work specified herein shall be the removal and disposal of Asbestos-Containing Materials (ACM) and asbestos-contaminated materials from designated areas of the Woodstock Branch Library, located at 761 East 160th Street, Bronx, New York, 10456.
- C. The following documents were reviewed and utilized to generate this abatement design specification which serves to locate and quantify the amount of ACM, and asbestos contaminated material, to be abated in support of this project.
  - 1. Scope of Work titled “Woodstock Branch Renovation”, dated 03/07/2012 prepared by RICE+LIPKA Architects;
  - 2. Set of drawings titled “Woodstock Library Interior Renovation and ADA Compliance” (100% Final Design), dated 03/07/2012, prepared by RICE+LIPKA Architects;
  - 3. Asbestos Survey Reports performed by Louis Berger & Associates, P.C. (LBA) dated 4/11/11 & 8/31/07 and Warren and Panzer report dated 10/30/03.
- D. The phasing and scheduling of work for this project shall be coordinated with and approved by the Construction Project Manager and Facility Manager. The Construction Project Manager and Facility Manager will make the final determination on all issues under this Contract covered by this Specification.

##### 1.02 SCOPE OF WORK

- A. Contractor is to provide all labor, materials, equipment, services, testing, appurtenances, permits and agreements necessary to perform the work required for the abatement of ACM as required by these contract documents. All work shall be performed in accordance with this Specification, EPA regulations, OSHA regulations, New York City Local Law 70, Title 15, Chapter 1 RCNY, New York State Industrial Code 56, NIOSH recommendations, and any other applicable federal, state or local government regulations. Whenever there is a conflict or overlap of the above references, the most stringent provisions are applicable.
- B. The intent of this Specification section is to ensure that the Contractor is responsible for the following:

## ASBESTOS ABATEMENT

1. Abatement of all ACM.
  2. Cleaning and decontamination of the entire affected area.
  3. Demolition that may be required to access ACM in each area, Contractor shall dispose of all debris associated with demolition activities as ACM waste.
  4. Removal and disposal of all ACM found within these areas such as fire alarm panel, large ductwork insulation patch, pipe fitting insulation on fiberglass, 9"x9" floor tile & associated mastic and tar on exhaust fan.
  5. Provide all scaffolding, platform installation, equipment, tools, transportation and any other equipment required and/or necessary to complete all work described in the Contract Documents.
  6. The Contractor shall be responsible for and shall include in its Bid any and all fees or changes imposed by Local, State or Federal Law, Rule or Regulation applicable to the work specified herein, including fees or charges which may be imposed subsequent to the date of the Bid opening.
  7. Prior to destructive demolition activities, the DDC may elect to collect bulk samples of assumed asbestos-containing materials and analyze the bulk samples for asbestos content.
- C. Contractor shall perform the following work as described below and indicated on the drawings. The drawings are only a diagrammatic representation of the Work Areas and do not constitute the actual quantities of material. Contractor is responsible for the confirmation of the actual total quantities of the Work to be performed prior to Bidding.
1. **Drawing H-002: Cellar Plan**
    - a. Remove and dispose of asbestos-containing fire alarm panel, large ductwork insulation patch and 2" – 4" O.D pipe fitting insulation on fiberglass within **Work Area 1**. Asbestos-containing fire alarm panel, large ductwork insulation patch shall be removed utilizing NYCDEP Title 15, Chapter 1, § 1-106 Tent Containment Procedures. Asbestos-containing 2" – 4" O.D. pipe fitting insulation on fiberglass shall be removed utilizing tent procedures as specified in NYCDEP Title 15, Chapter 1, § 1-105 Glovebag Procedure.

**ASBESTOS ABATEMENT**

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
1	NYCDEP Section § 1-106 Tent Containment Procedures	4 Sq. Ft. of Fire Alarm Panel	-
		6 Sq. Ft. of Large Ductwork Insulation Patch	-
	NYC DEP Section § 1-105 Glovebag Procedures	-	100 Ln. Ft. of 2" - 4" O.D. Pipe Fitting Insulation on Fiberglass

**2. Drawing H-003: First Floor and Mezzanine Plan**

- a. Remove and dispose of asbestos-containing 9"x9" tan floor tile & associated mastic under carpet and 2" O.D pipe fitting insulation on fiberglass within **Work Area 2** shall be removed utilizing Full Containment Procedures.
- b. Remove and dispose of 2" O.D pipe fitting insulation on fiberglass within **Work Area 3** shall be remove utilizing tent procedures as specified in NYCDEP Title 15, Chapter 1, § 1-105 Glovebag Procedure.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
2	NYCDEP Full Containment Procedures	4,119 Sq. Ft. of 9"x9" Tan Floor Tile and Associated Mastic under Carpet	-
		-	100 Ln. Ft. of 2" O.D. Pipe Fitting Insulation on Fiberglass
3	NYC DEP Section § 1-105 Glovebag Procedures	-	50 Ln. Ft. of 2" O.D. Pipe Fitting Insulation on Fiberglass

**3. Drawing H-004: Second Floor Plan**

- a. Remove and dispose of asbestos-containing 9"x9" cream floor tile & associated mastic and 2" O.D pipe fitting insulation on fiberglass within **Work Area 4** shall be removed utilizing Full Containment Procedures.

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Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
4	NYCDEP Full Containment Procedures	3,311 Sq. Ft. of 9"x9" Cream Floor Tile and Associated Mastic	-
		-	150 Ln. Ft. of 2" O.D. Pipe Fitting Insulation on Fiberglass

**4. Drawing H-005: Third Floor Plan**

- a. Remove and dispose of asbestos-containing of 9"x9" Tan Floor Tile and associated mastic within **Work Area 5A & 5B**. Asbestos-containing floor tiles and mastic shall be removed utilizing NYCDEP Title 15, Chapter 1, § 1-108 Procedures for Foam/Viscous Liquid Use in Flooring Removal. In areas where VAT is to be removed, the contractor shall be responsible to remove all layers of floor tile and associated mastic to the substrate surface. Multiple layers of floor tile will not be cause for additional compensation to the contractor. All layers of VAT and its associated mastics as well as any plywood and/or particle board in-between layers shall be disposed of as asbestos contaminated waste.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
5A & 5B	NYCDEP Section § 1-108 Foam/Viscous Liquid Use in Flooring Removal	1,650 Sq. Ft. of 9"x9" Tan Floor Tile and Associated Mastic	-

**5. Drawing H-006: Roof Plan**

- a. Remove and dispose of asbestos-containing of Tar on Exhaust Fan within **Work Area 6**. Work Area 1 shall be removed utilizing NYCDEP Title 15, Chapter 1, § 1-106 Tent Containment Procedures.

Work Area	Removal Procedure	Approximate Square Feet (Sq. Ft.)	Approximate Linear Feet (Ln. Ft.)
6	NYCDEP Section § 1-106 Tent Containment Procedures	100 Sq. Ft. of Tar on Exhaust Fan	-

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- D. The facility is under the jurisdiction of the New York City Public Library. The contractor shall perform the work of this contract in a manner that will be least disruptive to the normal use of the building.
- E. Contractor's attention is directed to the fact that patents cover certain methods of asbestos abatement indicated in the specifications. To date, patents have been issued with regard to negative pressure enclosures or negative or reduced pressure and glove-bag.
- F. Contractor shall be solely responsible for and shall hold the City of New York Department of Design and Construction and the City harmless from, any and all damages, losses and expenses resulting from any infringement by Contractor of any patent, including but not limited to the patents described above, used by Contractor during performance of this agreement.
- G. Prior to starting, the General Contractor must notify the Commissioner of the City of New York Department of Design and Construction if he anticipates any difficulty in performing the work as directed and required by these Specifications. Contractor shall be required to attend an on-site job meeting with the Construction Project Manager prior to start of work to examine conditions of the site for removal and plan the sequence for removal operations.
- H. The Contractor shall retain a certified Project Designer for the preparation of an Asbestos Variance Application (ACP-9), if required.
- I. The Contractor shall be responsible for preparing and submitting all filings, notifications, amendments and variances, etc. required by all City, State and Federal regulatory agencies having jurisdiction, at no additional cost to the NYC DDC.
- J. The Contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to prepare a Work Place Safety Plan (WSP), if required.
- K. The General Contractor shall retain a Registered Design Professional (person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York) to perform final inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required under Chapter 17 of the Building Code. Such special inspections and A-TR1 forms shall be completed by the Registered Design professional.
- L. For coordination with other Contractors, see the General Conditions governing all Contracts.
- M. Related Asbestos Removal Work Under Other Contracts:

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1. Each Contractor shall be responsible for the removal of incidental asbestos not identified in this section and found prior to or during the Work.
2. Incidental asbestos is defined as ACM that is discovered during the course of their work that must be abated to enable them to perform the work of their Contract.

### N. Work Hours:

1. The Contractor shall establish his work schedule in a way that avoids interference or conflict with the normal functioning of the facility. Work in the evenings shall be done at no additional cost to the City.
2. All work shall be done during regular working hours unless the Contractor requests authorization to work other than regular working hours and such authorization is granted by the Commissioner (Regular working hours are those during which any given facility in which work is to be done is customarily open and functioning). If such work schedule is authorized by the Commissioner the work shall be done at no additional cost to the City.
3. The order of phases and start dates associated with each will be determined by the Construction Project Manager.
4. Contractor shall be required to schedule waste transfer during evening hours, when activity within the facility is at a minimum. Evening hours are defined as 6:00 p.m. to 6:00 a.m. Waste transfer must be approved by the Construction Project Manager and Facility Manager.

### O. The following conditions shall apply to all temporary shutdowns of existing services:

1. All temporary lighting and temporary electrical services for use in the Work Area shall be in weather proof enclosures and be ground fault protected and:
  2. Shall be performed at no additional charge to the City.
  3. Shall be performed at times not interfering with the other activities in the building.
  4. Shall be performed only with written consent from the Commissioner and the Facility Manager.
  5. Shall be made through written request to the Commissioner at least 10 days in advance with complete written description of the work to be performed.

### P. Stages of Asbestos Removal Work:

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- a. The Abatement Contractor will be required to perform the work and it is the intent of this Specification to remove all asbestos containing and asbestos contaminated materials from the Work Area. The Contractor is responsible for verifying all quantities of materials listed here and Bid accordingly.

- Q. Certain equipment in the Work Area may need to remain operational during removal. Therefore, the removal of ACM from this equipment shall be performed as the last removal activities within the Work Area. The Contractor shall coordinate the scheduling for the removal of ACM on functioning equipment with the Construction Project Manager.

### 1.03 SPECIAL EXPERIENCE REQUIREMENTS FOR ASBESTOS ABATEMENT

- A. General: The special experience requirements set forth in Paragraph B below apply to the bidder for this contract.

1. Evaluation: Compliance with the special experience requirements will be evaluated at the time of the bid. The bidder is advised that failure to meet such special experience requirements will result in the rejection of the bid as non-responsive. Compliance with the experience requirements set forth herein will be determined solely by the City.
2. Compliance by the Bidder as an Entity: Compliance with the special experience requirements must be demonstrated by the BIDDER ITSELF, i.e., the actual entity submitting the bid. The bidder itself must have been in existence as the same entity for the three year period prior to the bid opening. During such period, the bidding entity itself must have achieved compliance with the special experience requirements. The bidding entity may not use or rely on the experience or credentials of any other entity; regardless of any relationship such other entity may have to the bidder.

- B. Requirements: The bidder must demonstrate compliance with the special experience requirements set forth in subparagraphs (1) through (5) below. The bidder must, as part of its bid, submit documentation demonstrating compliance with all listed requirements. Such documentation shall include without limitation, all required licenses, certificates, and documentation.

1. The bidder must, whether an individual, corporation, partnership, joint venture or other legal entity, demonstrate for the three year period prior to the bid opening, that it has been licensed by the New York State Department of Labor, as an "Asbestos Contractor".
2. The bidder must, for the three year period prior to the bid opening, have been in the business of providing asbestos abatement services as a routine part of its daily operations.

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3. The bidder (contractor) proposing to do asbestos abatement work must be thoroughly experienced in such work and must provide evidence of having successfully performed and completed in a timely fashion at least five(5) asbestos abatement projects of similar size and complexity. The aggregate cost of these projects must be at least \$1,000,000 in each of the three years.
  4. For each project submitted to meet the experience requirements set forth above, the bidder must submit the following information for the project; name and location of the project; name title and telephone number of the owner or the owner's representative who is familiar with the bidder's work; brief description of the work completed as a prime or sub-contractor; amount of contract or subcontract and the date of completion.
  5. The bidder must demonstrate that it has the financial resources, supervisory personnel and equipment necessary to carry out the work and to comply with the required performance schedule, taking into consideration other business commitments. The bidder must submit such documentation as may be required by the Department of Design and Construction to demonstrate that it has the requisite capacity to perform the required services of this contract.
- C. Throughout the specifications, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics thereof. Provide materials or workmanship that meet or exceed the specifically named codes or standards where required by these specifications.
- D. Site Investigation: Contractor shall inspect all the specifications and related drawings, and will investigate and confirm the site conditions affecting the work, including, but not limited to:
1. Physical considerations and conditions of both the material and structure. These considerations include any obstacles or obstructions encountered in accessing or removing the material.
  2. Handling, storage, transportation and disposal of the material.
  3. Availability of qualified and skilled labor.
  4. Availability of utilities.
  5. Exact quantities of all materials to be disturbed and/or removed.

**1.04 WORK BY OTHERS**

The City reserves the right during the term of this Contract to have work performed on asbestos abatement projects by other Contractors as the situation warrants.

**1.05 DEFINITIONS**

- A. General Explanation: Certain terms used in this Specification Section are defined below. Definitions and explanations of this Specification Section are not necessarily complete or exclusive, but are general for the Work to the extent they are not stated more explicitly in another element of the Contract Documents.
- B. Definitions in General Use:
1. Approve: Where used in conjunction with Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Engineer's responsibilities and duties as specified in Contract Documents. In no case will "approval" by Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of Contract Documents.
  2. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Engineer," "requested by Engineer," and similar phrases. However, no such implied meaning will be interpreted to extend Engineer's responsibility into Contractor's responsibility for construction supervision.
  3. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
  4. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.
  5. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

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6. **Installer:** The term "installer" is defined as the entity (person or firm) engaged by Contractor, or its subcontractor or sub-subcontractor for performance of a particular unit of work at Project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (installers) be expert in operations they are engaged to perform.
7. **Provide:** Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
8. **Third-Party Air Monitor:** The term "Third-Party Air Monitor" is defined as an entity engaged by City and Construction Project Manager to perform specific inspections or tests of the work, either at Project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.

### C. Definitions Relative to Asbestos Abatement:

1. **Abatement:** Any and all procedures physically taken to control fiber release from asbestos-containing materials. This includes removal, encapsulation, enclosure, cleanup and repair.
2. **Adequately Wet:** The complete penetration of a material with amended water to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then the material has not been adequately wetted. However, the absence of visible emissions is not evidence of being adequately wet. ACM must be fully penetrated with the wetting agent in order to be considered adequately wet. If the ACM being abated is resistant to amended water penetration, wetting agent shall be applied to the material prior to and during removal as necessary to minimize fiber release.
3. **Aggressive Sampling:** Method of sampling in which the individual collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.
4. **AHERA:** Asbestos Hazard Emergency Response Act of 1986
5. **AIHA:** American Industrial Hygiene Association.
6. **Airlock:** System for permitting entrance and exit while restricting air movement between a contaminated area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding

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through the second doorway, thereby preventing flow-through contamination.

7. Air Sampling: Process of measuring the fiber content of a known volume of air collected during a specific period. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400, or the provisional transmission electron microscopy methods developed by the US EPA which is utilized for lower detection levels and specific fiber identification.
8. Ambient Air Monitoring: "Ambient air monitoring" shall mean measurement or determination of airborne asbestos fiber concentrations outside but in the general vicinity of the worksite.
9. Amended Water: Water to which a surfactant has been added.
10. ANSI: American National Standards Institute
11. Area Air Sampling: Any form of air sampling or monitoring where the sampling device is placed at some stationary location.
12. Asbestos: Any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cumingtonite-grunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.
13. Asbestos-Containing Material (ACM): Asbestos or any material containing more than one-percent asbestos.
14. Asbestos-Containing Waste Material: ACM, asbestos-contaminated objects or debris associated with asbestos abatement requiring disposal.
15. Asbestos-Contaminated Objects: Any objects which have been contaminated by asbestos or asbestos-containing material.
16. Asbestos Assessment Report: "Asbestos Assessment Report" shall mean the "Form ACP-5" form, as approved by NYCDEP, by which a NYCDEP-certified asbestos investigator certifies that a building or structure (or portion thereof) is free of ACM or the amount of ACM to be abated constitutes a minor project.
17. Asbestos Handler: Individual who disturbs, removes, repairs, or encloses asbestos material. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.
18. Asbestos Handler Supervisor: Individual who supervises the handlers during an asbestos project and ensures that proper asbestos abatement procedures

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as well as individual safety procedures are being adhered to. This individual shall have completed approved training course(s) and be in possession of certification issued by NYCDEP and NYSDOL.

19. Asbestos Investigator: An individual certified by NYCDEP as having successfully demonstrated his or her ability to identify the presence of and evaluate the condition of asbestos in a building or structure.
20. Asbestos Project: Any form of work performed in a building or structure which will disturb (e.g., remove, enclose, encapsulate) more than 25 linear feet or more than 10 square feet of asbestos-containing material.
21. ASTM: American Society for Testing and Materials.
22. Asbestos Project Notification: The "Form ACP-7" asbestos project notification form as approved by DEP.
23. Authorized Visitor: Authorized visitor shall mean the building owner and his/her representative, and any representative of a regulatory or other agency having jurisdiction over the project.
24. Building Owner: Person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.
25. Building Materials: Any and all manmade materials, including but not limited to interior and exterior finishes, equipment, bricks, mortar, concrete, plaster, roofing, flooring, caulking, sealants, tiles, insulation, and outdoor paving such as sidewalks, paving tiles and asphalt.
26. Certified Industrial Hygienist (CIH): Individual with a minimum of five years experience as an industrial hygienist and who has successfully completed both levels of the examination administered by the American Board of Industrial Hygiene and who is currently certified by that board.
27. Certified Safety Professional (CSP): Individual having a bachelor's degree from an accredited college or university and a minimum of four years experience as a safety professional and who has successfully completed both levels of the examination administered by the Board of Certified Safety Professionals and who is currently certified by that board.
28. Chain of Custody: "Chain of Custody" shall mean the form or set of forms that document the collection and transfer of a sample.
29. City: City of New York

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30. Clean Room: An uncontaminated area or room that is part of worker decontamination enclosure system with provisions for storage of workers' street clothes and protective equipment.
31. Clearance Air Monitoring: Employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers and shall be performed as the final abatement activity.
32. Commissioner: shall mean the head of the Agency that has entered into this contract or his/her duly authorized representative.
33. Competent Person: Shall mean the designated person as defined by OSHA in 29 CFR1926.1101.
34. Curtained Doorway: Device that consists of at least three overlapping sheets of fire retardant plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to ensure that the sheets hang straight and maintain a seal over the doorway when not in use.
35. Decontamination Enclosure System: Series of connected rooms, separated from the Work Area and from each other by air locks, for the decontamination of workers, materials, waste containers, and equipment.
36. Demolition: The dismantling or razing of a building, including all operations incidental thereto (except for asbestos abatement activities), for which a demolition permit from the New York City Department of Buildings is required.
37. NYCDEP or DEP: The New York City Department of Environmental Protection.
38. Disturb: Any action taken which may alter, change, or stir, such as but not limited to the removal, encapsulation, enclosure or repair of asbestos-containing material.
39. DOB: The New York City Department of Buildings.
40. Egress: A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.
41. ELAP: Environmental Laboratory Approval Program administered by the New York State Department of Health.

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42. Encapsulant (sealant) or Encapsulating Agent: Liquid material which can be applied to ACM and which temporarily controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.
43. Encapsulation: The coating or spraying of asbestos-containing material encapsulant. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.
44. Enclosure: Construction of airtight walls and/or ceilings between ACM and the facility environment, or around surfaces coated with ACM, or any other appropriate procedure as determined by the NYCDEP which prevents the release of asbestos fibers.
45. EPA or USEPA: United States Environmental Protection Agency.
46. Equipment Room: Contaminated area or room that is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.
47. Exit: That portion of a means of egress system which is separated from other interior spaces of a building or structure by fire-resistance-rated construction to provide a protected path of egress travel between the exit access and the exit discharge.
48. FDNY: The Fire Department of the City of New York.
49. Fiber: An acicular single crystal or a similarity elongated polycrystalline aggregate which displays some resemblance to organic fibers by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.
50. Fixed Object: A unit of equipment, furniture, or other item in the work area which cannot be removed from the work area. Fixed objects shall include equipment, furniture, or other items that are attached, in whole or in part, to a floor, ceiling, wall, or other building structure or system or to another fixed object and cannot be reasonably removed from the work area. Fixed objects shall also include pipes and other equipment inside the work area

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which are not the subject of the asbestos project. Active fire suppression system components shall not be considered fixed objects.

51. Glovebag technique: shall mean a method for removing asbestos-containing material from heating, ventilation and air conditioning (HVAC) ducts, short piping runs, valves, joints, elbows, and other nonplanar surfaces. The glovebag assembly is a manufactured device consisting of a large bag (constructed of at least 6-mil transparent plastic), two inward-projecting long sleeve gloves, one inward-projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.
52. HEPA-Filter: High efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers mass median aerodynamic equivalent diameter.
53. HEPA vacuum equipment: "HEPA vacuum equipment" shall mean vacuuming equipment with a HEPA filter.
54. Holding Area: Chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.
55. Homogeneous Work Area: Portion of the Work Area that contains one type of ACM and/or where one type of abatement is used.
56. Industrial Hygiene: Science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among worker or among the citizens of the community.
57. Industrial Hygienist: Individual having a college or university degree or degrees in Engineering, Chemistry, Physics or Medicine, or related Biological Sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities:
  - a. To recognize the environmental factors and to understand their effect on people and their well being; and
  - b. To evaluate, on the basis of experience and with the aid of quantitative measurement techniques, the magnitude of these stresses in terms of ability to impair people's health and well being; and

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- c. To prescribe methods to eliminate, control, or reduce such stresses when necessary to alleviate their efforts.
- 58. Isolation Barrier: The construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibers in the work area.
- 59. Large Asbestos Project: Asbestos project involving the disturbances (e.g., removal, enclosure, encapsulation) of 260 linear feet or more of ACM or 160 square feet or more of ACM.
- 60. Log: An official record of all activities that occurred during the project. At a minimum, the log shall identify the building owner, agent, contractor, and workers, and other pertinent information including daily activities, cleanings and waste transfers, names and certificate numbers of asbestos handler supervisors and asbestos handlers; results of inspections of decontamination systems, barriers, and negative pressure ventilation equipment; summary of corrective actions and repairs; work stoppages with reason for stoppage; manometer readings at least twice per work shift; daily checks of emergency and fire exits and any unusual events.
- 61. Minor Project: A project involving the disturbance (e.g., removal, enclosure, encapsulation, repair) of 25 linear feet or less of asbestos containing material or 10 square feet or less of asbestos containing material.
- 62. Movable Object: Unit of equipment or furniture in the Work Area that can be removed from the Work Area.
- 63. Negative Air Pressure Equipment: Portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the Work Area.
- 64. NESHAPS: National Emission Standards for Hazardous Air Pollutants.
- 65. NFPA: The National Fire Protection Association.
- 66. NIOSH: National Institute for Occupational Safety and Health.
- 67. DEP or NYCDEP: New York City Department of Environmental Protection
- 68. NYSDOL: New York State Department of Labor.
- 69. NYSDOL ICR 56: "NYSDOL ICR 56" shall mean Part 56 of the Official Compilation of Codes, Rules and Regulations of the State of New York or 12 NYCRR Part 56.
- 70. NYSDOH: The New York State Department of Health.

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71. Obstruction: The blocking of a means of egress with any temporary structure or barrier. A double layer of fire-retardant 6-mil polyethylene sheeting shall not be considered an obstruction when it is prominently marked as an exit with photo luminescent signage or paint and cutting tools (knife, razor) are attached to the work area side of the sheeting for use in the event that the sheeting must be cut to permit egress. A corridor shall not be considered obstructed when there is a clear path measuring at least three (3) feet wide.
72. Occupied Area: Area of the work site where abatement is not taking place and where personnel or occupants normally function or where workers are not required to use personal protective equipment.
73. OSHA: Occupational Safety and Health Administration.
74. Outside air: "Outside air" shall mean the air outside the work place.
75. Person: Individual, partnership, company, corporation, association, firm, organization, governmental agency, administration, or department, or any other group of individuals, or any officer or employee thereof.
76. Personal Air Monitoring: Method used to determine employees' exposure to airborne asbestos fibers. The sample is collected outside the respirator in the worker's breathing zone.
77. Personal Protective Equipment (PPE): Appropriate protective clothing, gloves, eye protection, footwear, and head gear.
78. Phase Contrast Microscopy (PCM): The measurement protocol for the assessment of the fiber content of air. (NIOSH Method 7400).
79. Physician: Person licensed or otherwise authorized under Article 131 Section 65.22 of the New York State Education Law.
80. Plasticize: To cover floors and walls with fire retardant plastic sheeting as herein specified or by using spray plastics as acceptable to the Department.
81. Polarized Light Microscopy (PLM): The measurement protocol for the assessment of the asbestos content of bulk materials. (Interim Method for the Determination of Asbestiform Materials in Bulk Insulation Samples- 40 CFR Part 763, Subpart F, Appendix A as amended on September 1, 1982)
82. Project Designer: A person who holds a valid Project Designer Certificate issued by the New York State Department of Labor.

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83. Project Monitor: A person who holds a valid Project Monitor Certificate issued by the New York State Department of Labor.
84. Qualitative Fit Test: Individual test subject's responding (either voluntarily or involuntarily) to a chemical challenge outside the respirator face-piece. Acceptable methods include irritant smoke test, odorous vapor test, and taste test.
85. Quantitative Fit Test: Exposing the respiratory wearer to a test atmosphere containing an easily detectable, nontoxic aerosol, vapor or gas as the test agent. Instrumentation, which samples the test atmosphere and the air inside the face-piece of the respirator, is used to measure quantitatively the leakage into the respirator. There are a number of test atmospheres, test agents, and exercises to perform during the test.
86. Registered Design Professional: A person licensed and registered to practice the professions of architecture or engineering under the Education Law of the State of New York.
87. Removal: Stripping of any asbestos- containing materials from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subparts A and M.
88. Renovation: An addition or alteration or change or modification of a building or the service equipment thereof, that is not classified as an ordinary repair as defined in §27-125 of the Administrative Code of the City of New York.
89. Repair: Corrective action using specified work practices (e.g., glovebag, plastic tent procedures, etc.) to minimize the likelihood of fiber release from minimally damaged areas of ACM.
90. Replacement material: Any material used to replace ACM that contains less than .01 percent asbestos.
91. Shift: A worker's, or simultaneous group of workers', complete daily term of work.
92. Shower Room: Room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.
93. Small Asbestos Project: Asbestos project involving the disturbance (e.g., removal, enclosure, encapsulation) of more than 25 and less than 260 linear feet of ACM or more than ten and less than 160 square feet of ACM.

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94. Staging Area: Work Area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the Work Area.
95. Strip: To remove asbestos materials from any part of the facility.
96. Structural Member: Load-supporting member of a facility, such as beams and load-supporting walls, or any non-load-supporting member, such as ceiling and non-load-supporting walls.
97. Surface barriers: The plasticizing of walls, floors, and fixed objects within the work area to prevent contamination from subsequent work.
98. Surfactant: Chemical wetting agent added to water to improve penetration.
99. Transmission Electron Microscopy (TEM): The measurement protocol for the assessment of the asbestos fiber content of air. Interim Transmission Electron Microscopy Analytical Methods-40 CFR Part 763, Subpart E, Appendix A.
100. Visible Emissions: Emissions containing particulate material that are visually detectable without the aid of instruments.
101. Washroom: Room between the Work Area and the holding area in the equipment decontamination enclosure system where equipment and waste containers are wet cleaned and/or HEPA-vacuumed prior to disposal.
102. Waste decontamination enclosure system: "Waste decontamination enclosure system" shall mean the decontamination enclosure system designated for the controlled transfer of materials and equipment, consisting of a washroom and a holding area.
103. Wet Cleaning: "Wet cleaning" shall mean the removal of asbestos fibers from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.
104. Wet methods: "Wet methods" shall mean the use of amended water or removal encapsulants to minimize the generation of fibers during ACM disturbance.
105. Work Area: Designated rooms, spaces, or areas of the building or structure where asbestos abatement activities take(s) place.
106. Worker Decontamination Enclosure System: Portion of a decontamination enclosure system designed for controlled passage of workers and authorized visitors, consisting of a clean room, a shower room, and an equipment room

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separated from each other and from the Work Area by airlocks and curtained doorways.

107. Work Place: The work area and the decontamination enclosure system(s).
108. Work Place Safety Plan: Construction documents prepared by a registered design professional and submitted for review by DEP in order to obtain an asbestos abatement permit. Such plan shall include, but not be limited to, plans, sections, and details of the work area clearly showing the extent, sequence, and means and methods by which the work is to be performed.
109. Work Site: Premises where abatement activity is being performed. May be composed of one or more Work Areas.

### 1.06 STANDARD OPERATING PROCEDURES

- A. Develop and implement a written standard procedure for abatement work to ensure maximum protection and safeguard from asbestos exposure of the workers, visitors, employees, public, and environment.

- B. TELEPHONE PAGING DEVICE

The Contractor or his authorized representative shall, at all times during the normal workday or during periods of overtime work under this Contract, carry a digital telephone paging device ("Beeper") and/or cellular telephones which can be activated by a telephone number in the 212 or 646 or 718 or 917 or 929 area code. He shall supply the Department of Design and Construction with the activation number for the device and he is liable to respond back to the calls from DDC within the next one (1) hour period after he receives calls from DDC. The cost to the contractor for this device and all charges accruing thereto is deemed included in the Bid.

- C. The standard operating procedure shall ensure:
  1. Tight security from unauthorized entry into the workspace.
  2. Restriction of Contractor's personnel to the immediate Work Area and access/egress routes.
  3. Donning of proper protective clothing and respiratory protection prior to entering the Work Area.
  4. Safe work practices in the work place, including provisions for inter-room communications, exclusion of eating, drinking, smoking, or in any way breaking the respiratory protection.

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5. Proper exit practices from the work space to the outside through the showering and decontamination facilities.
  6. Removing asbestos in a way that minimizes release of fibers.
  7. Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimizes exposure and contamination.
  8. Emergency evacuation procedures, for medical or safety situations, to minimize the potential exposure to airborne asbestos fibers for emergency personnel, building occupants, and building environment.
  9. Safety from accidents in the workspace, especially from electrical shocks, fall hazards associated with scaffolding, slippery surfaces, and entanglements in loose hoses and equipment.
  10. Provisions for effective supervision, air monitoring and personnel monitoring for exposure during the work.
  11. Engineering controls that minimize exposure to fibers within the workspace.
  12. The contractor shall provide a 24-hour fire watch throughout the entire term of the project, to protect against fire and unauthorized entry into the workspace. Fire watch shall be performed by an individual who is a certified asbestos worker capable of entering the Work Area for regular inspections.
- D. Provide an Asbestos Handler Supervisor to provide continuous supervision of all work, and to be responsible for the following:
1. Ensure that individuals are using proper personal protective equipment and are trained in its use.
  2. Maintain entry log records and ensure that they are recorded in accordance with the provisions of Title 15, Chapter 1 of RCNY.
  3. Surveillance of the Work Areas at a minimum of once per work shift or as required by Title 15, Chapter 1 of RCNY, to ensure that the workers personal protective equipment is not torn or ripped and that respiratory protection is worn at all times.
  4. Ensure that sufficient personal protective equipment is stored in the clean room.
  5. Take precautions to prevent heat stress. Precautions include, but are not limited to, selecting lightweight protective clothing, reducing the work rate, and providing adequate fluid breaks.

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6. Perform work area inspection with project monitor prior to the commencement of final clearance air monitoring.
7. The contractor shall retain the asbestos handler supervisor to perform a visual inspection prior to the post-abatement clearance air monitoring to confirm that all containerized waste has been removed from work and holding areas and there is no visible ACM debris or residue on or about all abated surfaces.

### E. ENGINEERING CONTROLS

1. The 8-hour time weighted average airborne concentration of fibers to which any passerby may be exposed shall not exceed 0.01 fibers per cubic centimeter of air when fibers have a physical dimension longer than 5 micrometers as determined by the method prescribed in these Specifications.
2. All asbestos projects shall utilize negative pressure ventilation equipment.
  - a. The Contractor shall use a manometer to document the pressure differential. The Contractor shall install and make the manometer operational once the negative pressure has been established in the work area. Magnahelic manometers shall be calibrated at least every six months and a copy of the current calibration certification shall be available at the work site.
3. Negative pressure ventilation equipment shall be installed and operated to provide at least one air change in the work area every 15 minutes. Where there are no floor or wall barriers because floor or wall material is being abated, there shall be at least one air change in the work area every ten minutes.
4. The negative pressure ventilation equipment shall operate continuously, 24 hours a day, from the establishment of isolation barriers through successful clearance air monitoring. If such equipment shuts off, adjacent areas shall be monitored for asbestos fibers.
5. A static negative air pressure of 0.02 inches (minimum) water column shall be maintained at all times in the work place during abatement to ensure that contaminated air in the Work Area does not filter back to uncontaminated areas.
6. If the contaminated area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed

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electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors, the cut off switch shall be able to turn off the equipment on all floors.

7. On loss of negative pressure or electric power to the negative pressure ventilating units, abatement shall stop immediately and shall not resume until power is restored and negative pressure ventilation equipment is operating again.
8. Negative pressure ventilation equipment shall be exhausted to the outside of the building away from occupied areas.
  - a. All openings (including but not limited to operable windows, doors, vents, air intakes or exhausts of any mechanical devices) less than 15 feet from the exterior exhaust duct termination location shall be plasticized with two layers of fire retardant 6-mil polyethylene sheeting, or a second negative pressure ventilation unit with the primary unit's capacity shall be connected in series prior to exhausting to the outside.
  - b. Negative pressure ventilation equipment shall exhaust away from areas accessible to the public.
  - c. All ducting shall be sealed and braced or supported to maintain airtight joints. Ducts shall be reinforced and shall be installed so as to prevent breakage. Damage to ducts must be repaired immediately.
9. Where ducting to the outside is not possible, a second negative pressure ventilation unit compatible with the primary unit's capacity shall be connected in series. The area receiving the exhaust shall have sufficient, non-recycling exhaust capacity to the outside of the structure.
10. In the event that there is a failure of the containment system or a breach in the Isolation Barriers, all abatement work will cease and the Contractor will immediately correct the condition. Abatement work will not resume until the Work Area has been smoke tested by the third party laboratory and approved by the Construction Project Manager.

### F. LOCKDOWN ENCAPSULATION PROCEDURES

1. The following procedures shall be followed to seal in non-visible residue while conducting lockdown encapsulation on all surfaces from which ACM has not been removed:
  - a. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating

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requirements developed under the 1978 USEPA Contract shall be used for lockdown encapsulation.

- b. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon unless reviewed and approved by DEP.
- c. Latex paint with solids content greater than 15 percent shall be considered a lockdown sealant for coating all non-metallic surfaces.
- d. Encapsulants shall be applied using airless spray equipment. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.
- e. The cleaned layer of the surface barriers shall be removed from walls and floors.

The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

### 1.07 NOTIFICATIONS, PERMITS, WARNING SIGNS, LABELS, AND POSTERS

- A. The Contractor shall submit an Asbestos Project Notification (ACP-7) to the NYCDEP listing each work area within the building separately one week in advance of the start of work.
- B. The Contractor shall obtain an asbestos abatement permit authorizing the performance of construction work as required for asbestos projects involving one or more of the following activities:
  1. Obstruction of an exit door leading to an exit stair or the exterior of the building;
  2. Obstruction of an exterior fire escape or access to that fire escape;
  3. Obstruction of a fire-rated corridor leading to an exit door;
  4. Removal of handrails in an exit stair or ramp;
  5. Removal or dismantling of any fire alarm system component including any fire alarm-initiating device (e.g., smoke detectors, manual pull station);

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6. Removal or dismantling of any exit sign or any component of the exit lighting system, including photo luminescent exit path markings;
  7. Removal or dismantling of any part of a sprinkler system including piping or sprinkler heads;
  8. Removal or dismantling of any part of a standpipe system including fire pumps or valves;
  9. Removal of any non-load bearing / non-fire-rated wall (greater than 45 square feet or 50 percent of a given wall);
  10. Any plumbing work other than the repair or replacement of plumbing fixtures;
  11. Removal of any fire-resistance rated portions of a wall, ceiling, floor, door, corridor, partition, or structural element enclosure including spray-on fire resistance rated materials;
  12. Removal of any fire damper, smoke damper, fire stopping material, fire blocking, or draft stopping within fire-resistance rated assemblies or within concealed spaces;
  13. Any work that otherwise requires a permit from the DOB (full demolitions, alterations, renovations, modifications or plumbing work).
- C. The Contractor shall provide a floor plan showing the areas of the building under abatement and the location of all fire exits in said areas. It shall be prominently posted in the building lobby or comparable location, along with a notice stating the location within the building of the negative air cutoff switch, if applicable.
- D. The Contractor shall submit, as required, an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (1-8) and (B) (13) of this specification. The contractor is responsible for submitting, with an asbestos project notification, a work place safety plan (WPSP) and any other applicable construction documents. These documents must be prepared by a registered design professional (Professional Engineer or Registered Architect).
- E. A WPSP is not required for projects requiring an asbestos abatement permit due to one or more of the activities listed in 1.07 (B) (9-12) of this specification. The Contractor shall submit, together with the asbestos project notification, all applicable asbestos abatement permit construction documents.
- F. The General Contractor shall retain a Registered Design Professional to perform the inspections required pursuant to Title 28 of the Administrative Code, including but not limited to special inspections required by Chapter 17 of the Building Code, as follows:

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1. A final inspection shall be performed by a registered design professional retained by the Contractor after all work authorized by the asbestos abatement permit is completed. The person performing the inspection shall note all failures to comply with the provisions of the Building Code or approved asbestos abatement permit and shall promptly notify the owner in writing. All defects noted in such inspection shall be corrected. The final inspection report shall either:
  - a. Confirm:
    - (1) That the construction work is complete, including the reinstallation or reactivation of any building fire safety or life safety component.
    - (2) That any defects previously noted have been corrected.
    - (3) That all required inspections were performed.
    - (4) That the work is in substantial compliance with the approved asbestos abatement permit construction documents, the Building Code, and other applicable laws and rules.
  - b. Confirm:
    - (1) That the construction work does not return the building (or portion thereof) affected by the abatement project to a condition compliant with the building code and other applicable laws and rules, but that the registered design professional has reviewed an application for asbestos abatement permit construction documents approval that has been approved by the department of buildings, and the subsequent scope of work as approved will, upon completion, render all areas affected by the asbestos project in full compliance with the building code and all applicable laws and rules.
    - (2) That any defects previously noted that are not addressed by the subsequent scope of work as approved by the department of buildings, have been corrected.
    - (3) That all required inspections that are not addressed by the subsequent scope of work as approved by the department of buildings were performed.

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- (4) That all completed work pursuant to an asbestos abatement permit is in substantial compliance with the approved asbestos abatement permit construction documents.
- G. The contractor shall provide the final inspection reports to be filed with DEP on A-TR1 form. Records of final inspections made by registered design professionals shall be submitted to DDC as part of the close out document package.
- H. Erect bilingual (English-Spanish) warning signs around the work space and at every point of potential entry from the outside and at main entrance to building which can be viewed by the public without obstruction, in accordance with OSHA 29 CFR 1926.1101 (K) (Sign Specifications) and Title 15, Chapter 1 of RCNY. The warning signs shall be a bright color so that they will be easily noticeable. The size of the sign and the size of the lettering shall be no less than OSHA requirements.
- I. Provide the required labels for all polyethylene bags and all drums utilized to transport contaminated material to the landfill in accordance with OSHA 29 CFR 1926.1101 (K)(2) and by 49 CFR Parts 171 and 172 of the Department of Transportation regulations.
- J. Provide any other signs, labels, warnings, and posted instructions that are necessary to protect, inform and warn people of the hazard from asbestos exposure. Post in a prominent and convenient place for the workers a copy of the latest applicable regulations from OSHA, EPA, NIOSH, State of New York and New York City and any additional items mandated for posting by the aforementioned regulations.
- K. Furnish all permits, variances and notices required to perform the Work.

### 1.08 EMERGENCY PRECAUTIONS

- A. Establish emergency and fire exits from the Work Area. The clean side of all emergency exits shall be equipped with two full sets of protective clothing and respirators at all times.
- B. Notify local medical emergency personnel, both ambulance crews and hospital emergency room staff prior to commencement of abatement operations as to the possibility of having to handle contaminated or injured workmen, and shall be advised on safe decontamination.
- C. Prepare to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated immediately for decontamination. When an injury occurs, precautions shall be taken to reduce airborne fiber concentrations (i.e., misting of the air with water) until the injured person has been removed from the Work Area.

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- D. Notify, before actual removal of the asbestos material, the local police and fire departments to the danger of entering the Work Area. Contractor shall make every effort to help these agencies form plans of action should their personnel need to enter the contaminated area.

### 1.09 SUBMITTALS

A. Pre-Construction Submittals:

1. Attend a pre-construction meeting scheduled by the City of New York Department of Design and Construction. This meeting shall also be attended by a designated representative of the City of New York third party air monitoring firm, facility manager and the Construction Project Manager. At this meeting, the Contractor shall present three copies of the following items, bound and indexed. The detailed plan of action must be submitted at least five (5) days prior to the pre-construction meeting.
  - a. Contractor's scope of work, work plan and schedule.
  - b. Asbestos project notifications, approved variances and plans to Government Agencies.
  - c. Copies of Permits, clearance and licenses if required.
  - d. Schedules: the Contractor shall provide to the Construction Project Manager a copy of the following schedules for approval. Once approved, schedules shall be maintained and updated as received. Contractor shall post a copy of all schedules at the site:
    - (1) A construction schedule stating critical dates of the project including, but not limited to, mobilization, Work Area preparation, demolition, gross removal, fine cleaning, encapsulation, inspections, clearance monitoring, and phase of refinishing and final inspections. The schedule shall be updated biweekly, at a minimum.
    - (2) A schedule of staffing stating number of workers per shift per activity, name and number of supervisor(s) per shift, shifts per day, and total days to be worked.
    - (3) Submit all changes in schedule or staffing to the Construction Project Manager prior to implementation.
    - (4) A schedule of equipment to be used including numbers and types of all major equipment such as HEPA Air Filtration Units, HEPA-vacuums, airless sprayers, Water Atomizing Devices and Type "C" compressors.

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- e. A written plan and shop drawings for preparation of work site and decontamination chamber.
- f. Description of protective clothing and approved respirator to be used, make, model, NIOSH approval numbers.
- g. Delineation of responsibility of work site supervision, including competent person, with names, resumes, and home telephone numbers.
- h. Explanation of decontamination sequence and isolation techniques.
- i. Description of specific equipment to be utilized, including make and model number of air filtration devices, vacuums, sprayers, etc.
- j. Description of any prepared methods, procedures, techniques, or equipment other than those specified in the Contract Documents.
- k. Explanation of the handling of asbestos contaminated wastes including EPA and NYCDEP identification numbers of Waste Hauler.
- l. Description of the final clean-up procedures to be used.
- m. Name and qualifications of Contractor's Third-Party Air Monitor including AIHA accreditation, and proof of NIOSH PAT and NIST/NVLAP Bulk Quality Assurance Proficiency of OSHA samples for approval by the City of New York Department of Design and Construction.
- n. Written description of emergency procedures to be followed in case of injury or fire. This section must include evacuation procedures, source of medical assistance (name and telephone number) and procedures to be used for access by medical personnel (examples: first aid squad and physician). NOTE: Necessary Emergency Procedures Shall Take Priority Over All Other Requirements of These Specifications.
- o. Material Safety Data Sheets (MSDS) for encapsulants, sealants, firestopping foam, cleaners/disinfectants, spray adhesive and any and all potentially hazardous materials that may be employed on the project. No work involving the aforementioned will be allowed to proceed until MSDS are reviewed.
- p. Worker Training and Medical Surveillance: Contractor shall submit a list of the persons who will be employed by him and his

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Subcontractors in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.

- q. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.
    - (1) The Contractor shall provide a permanently bound log book of minimum 8-1/2" x 11" size at the entrance to the Worker and Waste Decontamination enclosure system as hereinafter specified. Log book shall contain on title page the project name, name, address and phone number of Environmental Control Representative; name, address and phone number of Abatement Contractor; name, address and phone number of Contractor and City's air testing entity; emergency numbers including, but not limited to local Fire/Rescue Department. Log book shall contain a list of personnel approved by the laboratory for entry into the Work Area.
    - (2) All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted. Any significant events occurring during the abatement project shall be entered into the log. Upon completion of the job, the Contractor shall submit the logbook containing a day-to-day record of personnel log entries countersigned by the Construction Project Manager every day.
  - r. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of ACM, understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.
- B. Submit copies of the following items to the Construction Project Manager during the work:
- 1. Security and safety logs showing names of person entering workspace, date and time of entry and exit, record of any accident, emergency evacuation, and any other safety and/or health incident.
  - 2. Progress logs showing the number of workers, supervisors, hours of work and tasks completed shall be submitted daily to the Construction Project Manager.

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3. Floor plans indicating Contractor's current work progress shall be submitted for review by the Construction Project Manager at weekly progress meetings.
4. All Contractors' air monitoring and inspection results.

### C. Project Closeout Submittals:

Upon completion of the project and as a condition of acceptance, the Contractor shall present two copies of the following items, bound and indexed:

1. Lien Waivers from Contractor, Sub-Contractors and Suppliers,
2. Daily OSHA air monitoring results,
3. All Waste Manifests (Asbestos and Construction Debris), seals and disposal logs,
4. Field Sign-In/Sign-Out Logs for every shift,
5. Copies of all Building Department Forms and Permits,
6. A Letter of Compliance stating that all the work on this project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations,
7. All Warranties as stated in the Specifications,
  - a. Fully executed disposal certificates and transportation manifest.
8. Project Record: The contractor shall maintain a project record for all small and large asbestos projects. During the project, the project record shall be kept on site at all times. Upon completion of the project, the project record shall be maintained by the building owner. The project record shall be submitted to DDC as part of the close out documents. The project record shall consist of:
  - a. Copies of licenses of all contractors involved in the project;
  - b. Copies of DEP and NYSDOL supervisor and handler certificates for all workers engaged in the project;
  - c. Copies of all project notifications and reports filed with DEP and NYSDOL for the project, with any amendments or variances;
  - d. Copies of all asbestos abatement permits, including associated approved plans and work place safety plan;

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- e. A copy of the air sampling log and all air sampling results;
  - f. A copy of the abatement contractor's daily log book;
  - g. All data related to bulk sampling including the results of any asbestos surveys performed by an asbestos investigator;
  - h. Copies of all asbestos waste manifests;
  - i. A copy of all Project Monitor's Reports (ACP-15).
  - j. A copy of each ATR-1 Form completed for the asbestos project (if required).
  - k. A copy of each Asbestos Project Conditional Closeout Report (ACP-20).
  - l. A copy of the Asbestos Project Completion Form (ACP-21).
9. The Contractor shall submit one of the following certifications to the DOB, with a copy provided to DDC:
- a. Asbestos Project Completion Form. If an asbestos project has been performed, a copy of the asbestos project completion form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.
  - b. An Asbestos Project Conditional Close-out Form. If an asbestos project has been performed a copy of the asbestos project conditional close-out form issued by DEP shall be submitted to DOB, with a copy being provided to DDC, prior to the issuance of a DOB permit and to any amendment of the underlying construction document approval which increases the scope of the project to include (a) work area(s) not previously covered.

### 1.10 QUALITY ASSURANCE

- A. All work required for the completion of this project or called for in this Specification must be executed in a workmanlike manner by using the appropriate methods established by regulatory requirements and/or industrial standards. All workmanship or work methods are subject to review and acceptance by the Construction Project Manager. Throughout the Specification, reference is made to codes and standards which establish qualities, levels or types of workmanship

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which will be considered acceptable. It is the Abatement Contractor's responsibility to comply with these codes and standards during the execution of this work.

- B. All materials and equipment required or consumed during the work of this Contract must meet the minimum acceptable criteria established by codes and standards referenced elsewhere in this Specification. Materials and equipment must be submitted for prior approval as part of the Contractor's "Shop Drawings".
- C. It is the Abatement Contractor's responsibility, when so required by the Specification or upon written request from the Commissioner or his representative to furnish all required proof that workmanship, materials and/or equipment meet or exceed the codes and standards referenced. Such proof shall be in the form requested, typically a certified report or test conducted by a testing entity approved for that purpose by DDC.
- D. The Contractor shall furnish proof that employees working under his supervision have had instruction on the dangers of asbestos exposure, on respirator use, decontamination, and OSHA regulations. This proof shall be in the form of a notarized affidavit to the effect that the above requirements have been satisfied.
- E. The Contractor will have at all times in his possession and in view at the job site the OSHA regulations 29 CFR 1910.1001, and 1926.1101 Asbestos, and Environmental Protection Agency 40 CFR, Part 61, subpart B: National Emission Standard for asbestos, asbestos stripping, work practices and disposal of asbestos waste. He shall also have one copy of NYC Title 15, Chapter 1 of RCNY and NYS DOL ICR 56 at the job site at all times.
- F. Familiarity with Pertinent Codes and Standards: In procuring all items used in this work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this work meet or exceed the specified requirements, and are suitable for their intended use.
- G. Rejection of Non Complying Items: The Commissioner reserves the right to reject items incorporated into the work that fail to meet the specified minimum requirements. The Commissioner further reserves the right, and without prejudice to other recourse that maybe taken, to accept non-complying items subject to an adjustment in the Contract amount as approved by the City.
- H. Applicable Regulations, Codes and Standards: Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

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1. American National Standards Institute (ANSI)  
(Successor to USASI and ASA)  
25 West 43<sup>rd</sup> Street (between 5<sup>th</sup> and 6<sup>th</sup> Avenue) 4<sup>th</sup> Floor  
New York, NY 10036  
212-642-4900
2. American Society for Testing and Materials (ASTM)  
100 Bar Harbor Drive  
West Conshohocken, PA 19428-2959  
610-832-9500
3. National Institute for Occupational Safety and Health (NIOSH)  
Robert A. Taft Laboratory  
4676 Columbia Pkwy  
Mailstop R12 Cincinnati, Ohio 45226  
513-841-4428
4. National Electrical Code (NEC)  
See NFPA
5. National Fire Protection Association (NFPA)  
1 Batterymarch Park  
Quincy, Massachusetts 02169-7471  
617-770-3000
6. New York City Fire Department (FDNY)  
9 Metrotech Center  
Brooklyn, NY 11201-5431  
718-999-2117
7. New York City Department of Buildings (NYC DOB)  
Enforcement Division  
280 Broadway, New York, New York 10007  
212- 566-2850
8. New York City Department of Environmental Protection (NYCDEP)  
Bureau of Environmental Compliance  
Asbestos Control Program  
59-17 Junction Boulevard, 8<sup>th</sup> Floor  
Corona, New York 11368  
718-595-3682
9. New York City Department of Health and Mental Hygiene (NYC DOHMH)  
Environmental Investigation  
125 Worth Street  
New York, New York 10013  
212-442-3372

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10. New York State Department of Labor (NYSDOL)  
Division of Safety and Health  
Engineering Services Unit  
State Office Building Campus  
Albany, New York 12240-0010
  11. New York City Department of Sanitation  
125 Worth Street, Room 714  
New York, New York 10013  
212-566-1066
  12. Occupational Safety and Health Administration (OSHA)  
Region II - Regional Office  
201 Varick Street, Room 908  
New York, New York 10014  
212-337-2378
  13. United States Environmental Protection Agency (EPA or USEPA)  
Region II  
Asbestos NESHAPS Contact  
Air and Waste Management Division  
(Air Compliance Branch) – USEPA  
290 Broadway, 21<sup>st</sup> Floor  
New York, New York 10007-1866  
212-637-3660
- I. Post all applicable regulations in a conspicuous place at the job site. Assure that the regulations are not altered, defaced or covered by other materials. One copy of each regulation must also be kept at the Contractor's office.

### 1.11 CITY/CONTRACTOR RESPONSIBILITIES

- A. The normal occupants of the Work Areas will be relocated by the City prior to the performance of the abatement work and returned there to at the conclusion of the abatement work, at no cost to the Contractor. However, the Contractor shall protect all furniture and equipment in the Work Areas in a manner as hereinafter specified. In addition, the Contractor shall perform the work of this Contract in a manner that will be least disruptive to the normal use of the non-Work Areas in the building.
- B. Contractor shall be responsible for cleaning all portable items not specifically addressed by the Facility, in the Work Areas, or dispose of same as asbestos contaminated waste.
- C. Facility to provide Contractor with a list of items that cannot be removed and need special attention.

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- D. Facility to stop all deliveries that may be scheduled to the Work Area while work is in progress.
- E. Facilities to have authorized personnel on site at all times or supply the Contractor with means of contacting such personnel without unreasonable delay. Such personnel shall have access to all areas, have knowledge of electrical, and air handling equipment. Such personnel shall assist the Contractor in case of any power failure or breakdown to shut down air supply systems, to reset and control all protective systems such as alarms, sprinklers, locks, etc. The Facility shall ensure no active air handling systems are operating within the Work Area.
- F. City will not occupy the portions of the building, in which work is being performed during the entire asbestos removal operation, including completion of clean up.
- G. Contractor shall provide a plan for 24 hour job security both for prevention of theft and for barring entry of curious but unprotected personnel into Work Areas.
- H. Contractor shall provide surveillance by a fire watch and set forth procedures to be taken for the safety of building occupants in the event of an emergency, in accordance with the WSPS.
- I. Should the failure of any utility occur, the City will not be responsible to the Contractor for loss of time or any other expense incurred.
- J. Facility will be responsible to notify the Contractor of any planned electrical power shutdowns in order to ensure that there are no power interruptions in the negative air pressure systems.
- K. Contractor shall remove all flammable materials from the work area and all sources of ignition (including but not limited to pilot lights) shall be extinguished.
- L. Contractor shall require a competent person (as defined in OSHA 1926.1101) to perform the following functions and to be on-site continuously for the duration of the project:
  - 1. Monitor the set up of the Work Area enclosure and ensure its integrity.
  - 2. Control entry and exit into the work enclosure.
  - 3. Ensure that employees are adequately trained in the use of engineering controls, proper work practices, proper personal protective equipment and in decontamination procedures.
  - 4. Insure that employees use proper engineering controls, proper work practices, proper personal protective equipment and proper decontamination procedures.

5. The competent person (as defined in OSHA1926.1101) shall check for rips and tears in work suits, and ensure that they are mended immediately or replaced.

**1.12 USE OF BUILDING FACILITIES**

- A. City shall make available to the Contractor, from existing outlets and supplies, all reasonably required amounts of water and electric power at no charge.
- B. Electric power to all Work Areas shall be shut down and locked out except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided by Contractor in accordance with applicable codes. All power to Work Areas shall be brought in from outside the area through ground-fault interrupter circuits installed at the source. Stationary electrical equipment within the Work Area, which must remain in service, shall be adequately protected, enclosed and ventilated. The Facility will identify all electric lines that must remain in service. Contractor shall protect all lines.
- C. Contractor shall provide, at his own expense, all electrical, water, and waste connections, tie-ins, extensions, and construction materials, supplies, etc. All water tie-ins shall be hard piped with polyethylene or copper piping. At the end of each shift, Contractor shall disconnect all hoses within the work zone and place in equipment room of the worker decontamination unit. Contractor shall ensure positive shutoff of all water to Work Area during non-working hours.
- D. Utilities:
  1. General:

All temporary facilities required to be installed, shall be subject to the approval of the Commissioner. Prior to starting the work at any site; specify clearly the temporary locations of facilities preferably with sketches and submit the same to the Construction Project Manager for approval.
  2. Water:

The Department of Design and Construction will furnish all water needed for construction, at no cost to the Contractor in buildings under their jurisdiction. All temporary plumbing or adaptations to supply the needs of the Work Area shall be installed and removed by the Contractor and the cost thereof included in the Lump Sum price Bid for abatement work. Shower water for the decontamination unit shall be provided hot. Heating of water, if necessary, shall be provided by the Contractor.
  3. Electricity:

The Department of Design and Construction will furnish all electricity needed for construction, at no cost to the Contractor in buildings under their jurisdiction. All temporary electrical work or adaptations to supply the

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needs of the Work Area shall be installed and removed by the Contractor and the cost thereof included in the Lump Sum price Bid for abatement work.

In leased spaces, arrangements for water supplies and electricity must be made with the landlord. However, all such arrangements must be made through and are subject to approval of the Department of Design and Construction. Utilities will be provided at no cost to the Contractor. However, it is the Contractor's (or the General Contractor's) responsibility to furnish and install a suitable distribution system to the Work Area. This system will be provided at no cost to the City.

A dedicated power supply for the negative pressure ventilating units shall be utilized. The negative air equipment shall be on a ground fault circuit interrupter (GFCI) protected circuit separate from the remainder of the work area temporary power circuits.

- E. Contractor shall shut down and lock out all electric power to all work areas except for electrical equipment that must remain in service. Safe temporary power and lighting shall be provided in accordance with all applicable codes. Existing light sources (e.g., house lights) shall not be utilized. All power to work areas shall be brought in from outside the area through ground-fault circuit interrupter at the source.
1. If electrical circuits, machinery, and other electrical systems in or passing through the work area must stay in operation due to health and safety requirements, the following precautions must be taken:
    - a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed. All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.
    - b. Any energized circuits remaining in the work area shall be posted with a minimum two (2) inch high lettering warning sign which reads: DANGER LIVE ELECTRICAL - KEEP CLEAR. A sign shall be placed on all live covered barriers at a maximum of ten (10) foot intervals. These signs shall be posted in sufficient numbers to warn all persons authorized to enter the work area of the existence of the energized circuits.
  2. Any source of emergency lighting which is temporarily blocked as a result of work place preparation shall be replaced for the duration of the project by

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battery operated or temporary exit signs, exit lights, or photo luminescent path markings.

- F. Contractor shall provide a separate temporary electric panel board to power Contractor's equipment. The Facility will designate an existing electrical source in proximity to the Work Area. Contractor's licensed electrician shall provide temporary tie-in via cable, outlet boxes, junction boxes, receptacles and lights, all with ground fault interruption. At no time shall extension cords greater than 50-feet in length be allowed. All temporary electrical installation shall be in accordance with OSHA regulations. The electric shut down for power panel tie-in will be on off-hours and must be coordinated with the Facility. Contractor shall provide to the City a specification and drawing outlining his power requirements at the pre-construction meeting.
- G. Additional electrical equipment (i.e., transformers, etc.), which is necessary due to the lack of existing power on the floor, shall be at the Contractor's expense.
- H. Contractor shall provide fire protection in accordance with all State and Local fire codes.
- I. Sprinklers, standpipes, and other fire suppression systems shall remain in service and shall not be plasticized.
- J. When temporary service lines are no longer required, they shall be removed by the Contractor. Any parts of the permanent service lines, grounds and buildings, disturbed or damaged by the installation and/or removal of the temporary service lines, shall be restored to their original condition by the Contractor. Senior Stationary Engineer will inspect and test all switches, controls, gauges, etc. and shall submit a list to the Construction Project Manager of any equipment damaged by the Contractor.
- K. Contractor shall supply hot shower water necessary for use in the decontamination unit.

### 1.13 USE OF THE PREMISES

- A. Contractor shall confine his apparatus, the storage of materials, and supplies, and the operation of his workmen to limits established by law, ordinances, and the directions of the Construction Project Manager and the Facility. All flammable or combustible materials shall be properly stored to obviate fire and in areas approved by the Facility.
- B. Contractor shall assure that no exits from the building are obstructed, that appropriate safety barriers are established to prevent access, and that Work Areas are kept neat, clean, and safe.

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- C. Contractor shall maintain exits from the work area or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.
- D. If the openings of temporary structural partitions related to abatement work areas block egress, the partition shall consist of two sheets of fire retardant 6-mil plastic, prominently marked as an exit with photo luminescent paint or signage. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress.
- E. All surrounding work, fixtures, soil lines, drains, water lines, gas pipes, electrical conduit, wires, utilities, duct work railings, shrubbery, landscaping, etc. which are to remain in place shall be carefully protected and, if disturbed or damaged, shall be repaired or replaced as directed by the City, at no additional cost.
- F. All routes through the building to be used by the Contractor shall first be approved by the Construction Project Manager and the Facility.
- G. Attention is specifically drawn to the fact that other Contractors, performing the work of other Contracts, may be (or are) brought upon any of the work sites of this Contract. Therefore, the Contractor shall not have exclusive rights to any site of his work and shall fully cooperate and coordinate his work with the work of other Contractors who may be on (or are on) any site of the work of this Contract. Regulated area exempted.
- H. Temporary toilet facilities must be provided by the Contractor on the site. Coordinate location of facilities with Construction Project Manager. No toilet facilities will be allowed in the Work Area.

### 1.14 PROTECTION AND DAMAGE

- A. The Contractor is responsible to cover all furniture and equipment that cannot be removed from Work Areas. Moveable furniture and equipment will be removed from Work Areas by Contractor prior to start of work and returned upon successful completion of the final air testing. At the conclusion of the work (after clearance level of air testing reaches the acceptable limit), the Contractor will remove all plastic covering from the walls, floors, furniture, equipment and reinstall furniture and equipment in the cleaned Work Area. The Contractor shall remove all shades, curtains and drapes from the Work Area, and reinstall the same following the final clean up.
- B. Prior to plasticizing, the proposed work areas shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning methods. Methods that raise dust, such as sweeping or vacuuming with equipment not equipped with HEPA filters, are prohibited.

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- C. Use rubber tired vehicles that use non-volatile fuels for conveying material inside building and provide temporary covering, as necessary, to protect floors.
- D. No materials or debris shall be thrown from windows or doors of the building. Building waste system shall NOT be used to remove refuse.
- E. Debris shall be removed from the work site daily. Premises shall be left neat and clean after each work shift, so that work may proceed the next regular workday without interruption. Limited bag storage may take place within the Work Area when approved by the Construction Project Manager.
- F. Protect floors and walls along removal routes from damage, wear and staining with contamination control flooring. All finished surfaces to be protected with Masonite or other rigid sheathing material.
- G. A preliminary inspection for pre-existing damage shall be conducted by Contractor and representative of the City before commencement of the project.

### 1.15 RESPIRATORY PROTECTION REQUIREMENTS

- A. Respiratory protection shall be worn by all individuals who may be exposed to asbestos fibers from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with Regulations and these Specifications.
- B. Contractor shall develop and implement a written respiratory protection program with required site-specific procedures and elements. The program shall be administered by a properly trained individual. The written respiratory protection program shall include the requirements set forth in OSHA Standard 29 CFR 1910.134, at a minimum.
- C. The Contractor shall provide workers with individually issued and marked respiratory equipment. Respiratory equipment shall be suitable for the asbestos exposure level(s) in the Work Area(s), as specified in OSHA Standards 26 CFR 1910.134 and 29 CFR 1926.1101, NIOSH Standard 42 CFR 84, or as more stringently specified otherwise, herein.
- D. Where respirators with disposable filter parts are employed, the Contractor will provide sufficient filter parts for replacement as necessary or as required by the applicable regulation.
- E. All respiratory protection shall be NIOSH approved. All respiratory protection shall be provided by Contractor, and used by workers in conjunction with the written respiratory protection program.
- F. Contractor shall provide respirators selected by an Industrial Hygienist that meet the following requirements:

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Table 1. -- Assigned Protection Factors

Type of Respirator	Half mask	Full facepiece	Helmet/hood
1. Air-Purifying Respirator	<sup>3</sup> 10	50	.....
2. Powered Air-Purifying Respirator (PAPR)	50	1,000	<sup>4</sup> 25/1,000
3. Supplied-Air Respirator (SAR) or Airline Respirator			
• Demand mode	10	50	.....
• Continuous flow mode	50	1,000	<sup>4</sup> 25/1,000
• Pressure-demand or other positive-pressure mode	50	1,000	.....
4. Self-Contained Breathing Apparatus (SCBA)			
• Demand mode	10	50	50
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	10,000	10,000

Notes:

<sup>1</sup>Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

<sup>2</sup>The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

<sup>3</sup>This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

<sup>4</sup>The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

<sup>5</sup>These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

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- G. Selection of high efficiency filters:
1. All high efficiency filters shall have a nominal efficiency rating of 100 (99.97-percent effective) when tested against 0.3-micrometer monodisperse diethyl-hexyl phthalate (DOP) particles.
  2. Choose N-, R-, or P-series filters based upon the presence or absence of oil particles.
    - a. N-series filters shall only be used for non-oil solid and water based aerosols or fumes.
    - b. R- and P-series filters shall be used when oil aerosols or fumes (i.e., lubricants, cutting fluids, glycerin, etc.) are present. The R-series filters are oil resistant and the P-series filters are oil proof.
    - c. Follow filter manufacture recommendations.
  3. If a vapor hazard exists, use an organic vapor cartridge in combination with the high efficiency filter.
- H. Historical airborne fiber level data may serve as the basis for selection of the level of respiratory protection to be used for an abatement task. Historical data provided by the Contractor shall be based on personal air monitoring performed during work operations closely resembling the processes, type of material, control methods, work practices, and environmental conditions present at the site. Documentation of aforementioned results may be requested by the City and/or Third-Party Air Monitor for review. This will not relieve the Contractor from providing personal air monitoring to determine the time-weighted average (TWA) for the work under contract. The TWA shall be determined in accordance with 29 CFR 1926.1101.
- I. At no time during actual removal operations shall half-mask air purifying respirators be allowed unless a full 8-hour TWA and excursion limit have been conducted, and reviewed by the Construction Project Manager. If the TWA and excursion limit have not been conducted, a Supplied-Air Respirator (SAR) or Airline Respirator or Self-Contained Breathing Apparatus (SCBA) must be used. Use of single use dust respirators is prohibited for the above respiratory protection.
- J. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.
- K. Contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every 12 months thereafter with the type of respirator he/she will be using.

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- L. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.
- M. No facial hairs (beards) shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.
- N. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the Contractor at the Contractor's expense.
- O. Respiratory protection maintenance and decontamination procedures shall meet the following requirements:
  - 1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134 (b); and
  - 2. High efficiency filters for negative pressure respirators shall be changed after each shower; and
  - 3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures as stated in Section 3.03 and/or 3.04.
  - 4. Airline respirators with high efficiency filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator face pieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers recommendations; and
  - 5. Respirators shall be stored in a dry place and in such a manner that the face-piece and exhalation valves are not distorted; and
  - 6. Organic solvents shall not be used for washing of respirators.
- P. Authorized visitors shall be provided with suitable respirators and instruction on the proper use of respirators whenever entering the Work Area. Qualitative fit test shall be done to ensure proper fit of respirator.

### 1.16 PROTECTIVE CLOTHING

- A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. Provide to all workers, foremen, superintendents, authorized visitors and inspectors, protective disposable clothing consisting of full body coveralls, head covers, gloves and 18-inch high boot type covers or reusable footwear.

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- B. In addition to personal protective equipment for workers, the Contractor shall make available at each worksite at least four (4) additional uniforms and required respiratory equipment each day for personnel who are authorized to inspect the work site. He/she shall also provide, for the duration of the work at any site involving a decontamination unit for worksite access, a lockable storage locker for use by the Construction Project Manager. In addition to respiratory masks for workers, the Contractor must have on hand at the beginning of each work day, at least four (4) masks each with two sets of fresh filters, for use by personnel who are authorized to inspect the worksite. The Contractor shall check for proper fit of the respirators of all City personnel authorized to enter the Work Area.
- C. Asbestos handlers involved in tent procedures shall wear two (2) disposable suits, including gloves, hood and footwear, and appropriate respiratory equipment. All street clothes shall be removed and stored in a clean room within the work site. The double layer personal protective equipment shall be used for installation of the tent and throughout the procedure, if a decontamination unit (with shower and clean room) is contiguous to the Work Area, only one (1) layer of disposable personal protective equipment shall be required; in this case, prior to exiting the tent the worker shall HEPA vacuum and wet clean the disposable suit.
- D. The outer disposable suit (if 2 suits are worn) shall be removed and remain in the tent upon exiting. Following the tent disposal and work site clean up the workers shall immediately proceed to a shower at the work site. The inner disposal unit and respirator shall be removed in the shower after appropriate wetting. The disposal clothing shall be disposed of as asbestos-containing waste material. The workers shall then fully and vigorously shower with supplied liquid bath soap, shampoo, and clean dry towels.
- E. Coveralls: provide disposable full-body coveralls and disposable head covers. Require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes for all workers in the Work Area.
- F. Boots: provide work boots with non-skid soles, and where required by OSHA, foot protection, for all workers. Provide boots at no cost to workers. Paint uppers of all boots yellow with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason after being contaminated with ACM and/or dust.
- G. Hard Hats: provide hard hats as required by OSHA for all workers, and provide a minimum of four spares for Inspectors, visitors, etc. Label all hats with same warning label as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may cause potential head injury. Provide hard hats of the type with polyethylene strap suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean and decontaminate and bag hard hats prior to removing them from the Work Area at the end of the work.
- H. Goggles: provide eye protection (goggles) as required by OSHA for all workers involved in any activity that may potentially cause eye injury. Require them to be

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worn at all times during these activities. Thoroughly clean and decontaminate goggles before removing them from the Work Area.

- I. Gloves: provide work gloves to all workers, of the type dictated by the Work and OSHA Standards. Do not remove gloves from the Work Area. Dispose of as asbestos-asbestos contaminated waste at the end of the work. Gloves shall be worn at all times, except during Work Area Preparation activities that do not disturb ACM.
- J. Reusable footwear, hard hats and eye protection devices shall be left in the contaminated Equipment Room until the end of the Asbestos Abatement Work.
- K. Disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits from the workspace to the outside through the decontamination facility.
- L. Respirators, disposable coveralls, head covers and foot covers shall be provided by the Contractor for the Facilities Representative, Construction Project Manager and any other authorized representative who may inspect the Work Area. Provide two respirators and six respirator filter changes per day.

### 1.17 AIR MONITORING - CONTRACTOR

- A. Contractor shall employ a qualified industrial hygiene laboratory to analyze air samples in accordance with OSHA Regulations, 1926.1101 (Asbestos Standards for Construction) and New York City regulations. All costs for this work shall be included in the Bid Price.
- B. The industrial hygiene laboratory shall be a current proficient participant in the American Industrial Hygiene Association (AIHA) PAT Program. The laboratory identification number shall be submitted and approved by the City. The laboratory shall be accredited by the AIHA and New York State Department of Health Environmental Laboratory Approval Program (ELAP).
- C. Industrial hygiene laboratory shall also be a current proficient participant in the NIST/NVLAP Quality Assurance Program for the identification of bulk samples. Laboratory identification number shall be submitted to and approved by the City.
- D. Air monitoring responsibilities for the contractor's employees, shall be performed by a representative of the industrial hygiene laboratory retained by the Contractor.
- E. Contractor shall submit to the City all credentials of the designated (as defined in OSHA 1926.1101) and industrial hygiene laboratory representative for approval.
- F. Air monitoring and inspection shall be conducted by the Contractor's competent person (as defined in OSHA 1926.1101).

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- G. Continuous (daily or per shift) monitoring and inspection will include Work Area samples, personnel samples from the breathing zone of a worker to accurately determine the employees' 8-hour TWA (unless Type C respirators are used) and decontamination unit clean room samples.
- H. Work Area samples and employee personnel samples shall be taken using pumps whose flow rates can be determined to an accuracy of +5-percent, at a minimum of two liters per minute. This must be demonstrated at the job site.
- I. Sampling and analysis methods shall be per NIOSH 7400A.
- J. Test Reports:
  - 1. Promptly process and distribute one copy of the test results, to the Commissioner.
  - 2. Prompt reports are necessary so that if required, modifications to work methods and/or practices may be implemented as soon as possible.
  - 3. Contractor shall by facsimile notify the Commissioner within 24 hours of the results of each test, followed by written notification within three days.
- K. Competent person shall conduct inspections and provide written reports daily. Inspections will include checking the standard operating procedures, engineering control systems, respiratory protection and decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project which may affect the health and safety of the people and environment.
- L. All costs for required air monitoring by the Contractor's competent person shall be borne by the Contractor.
- M. The City reserves the right to conduct air and surface dust sampling in conjunction with and separate from the Third-Party Air Monitor for the purposes of Quality Assurance.
- N. All samples shall be accompanied by a Chain of Custody Record that shall be submitted to the Construction Project Manager upon completion of analysis.

### 1.18 THIRD PARTY MONITORING AND LABORATORY

- A. The NYCDDC, at its own expense, will employ the services of an independent Third Party Air Monitoring Firm and Laboratory. The Third Party Air Monitor will perform air sampling activities and project monitoring at the Work Site.
- B. The Laboratory will perform analysis of air samples utilizing Phase Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM). This laboratory shall meet the standards stated in Paragraph 1.17. B.

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- C. Observations will include, but not be limited to, checking the standard operating procedures, engineering control systems, respiratory protection, decontamination systems, packaging and disposal of asbestos waste, and any other aspects of the project that may affect the health and safety of the environment, Contractor, and/or facility occupants.
- D. The Third Party Air Monitoring Firm and the designated Project Monitor shall have access to all areas of the asbestos removal project at all times and shall continuously inspect and monitor the performance of the Contractor to verify that said performance complies with this Specification. The Third-Party Air Monitor shall be on site throughout the entire abatement operation.
- E. The NYCDDC will be responsible for costs incurred with the Third Party Air Monitoring Firm and laboratory work. Any subsequent additional testing required due to limits exceeded during initial testing shall be paid for by the Contractor.
- F. At a minimum, air sampling shall be conducted in accordance with the following schedule:

<b>Abatement Activity</b>	<b>Pre-Abatement</b>	<b>During Abatement</b>	<b>Post-Abatement</b>
Equal to or greater than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	TEM
Less than 10,000 square feet or 10,000 linear feet of ACM	PCM	PCM	PCM

Note: TEM is acceptable wherever PCM is required.

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- G. The number of air samples required per stage of abatement and size of abatement project is listed in the table below:

		Pre-Abatement	During Abatement	Post Abatement
Large Asbestos Projects				
1.	Full Containment	10	5	10
2.	Glovebag inside Tent	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>
3.	Exterior Foam and Vertical Surfaces	-	5 <sup>c</sup>	5 <sup>d</sup>
4.	Interior Foam	10	5 <sup>c</sup>	10 <sup>d</sup>
Small Asbestos Projects				
1.	Full Containment	6	3	6
2.	Glovebag inside Tent	3 <sup>b</sup>	3 <sup>b</sup>	3 <sup>b</sup>
3.	Tent	3 <sup>b</sup>	3 <sup>b</sup>	3 <sup>b</sup>
4.	Exterior Foam and Vertical Surfaces	-	3 <sup>c</sup>	3 <sup>d</sup>
5.	Interior Foam	6	3 <sup>c</sup>	6 <sup>d</sup>
Minor Projects				
1.	Glovebag inside Tent	-	-	1 <sup>d</sup>
2.	Tent	-	-	1 <sup>d</sup>
3.	Exterior Foam and Vertical Surfaces	-	-	1 <sup>d</sup>
4.	Interior Foam	-	-	1 <sup>d</sup>

Notes:

- a. if more than three (3) tents then two (2) samples required per enclosure.
- b. if more than three (3) tents then one (1) sample required per enclosure.
- c. samples shall be taken within the work area(s).
- d. area sampling is required only if:
  - visible emissions are detected during the project
  - during-abatement area sampling results exceeded 0.01 f/cc or the pre-abatement area sampling result(s) for interior projects where applicable.
  - work area to be reoccupied is an interior space at a school, healthcare, or daycare facility.

- H. Prior to commencement of abatement activities, the Third Party Air Monitoring Firm will collect a minimum number of area samples inside each homogeneous work area.

1. Samples will be taken during normal occupancy activities and circumstances at the work site.

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2. Samplers shall be located within the proposed work area and at all proposed isolation barrier locations.
  3. Samples shall be analyzed using PCM.
  4. The number of samples to be collected will be determined by the size of the project and the abatement methods to be utilized.
- I. Frequency and duration of the air sampling during abatement shall be representative of the actual conditions during the abatement. The size of the asbestos project will be a factor in the number of samples required to monitor the abatement activities. The following minimum schedule of samples shall be required daily.
1. For large asbestos projects employing full containment, area air sampling shall be performed at the following locations:
    - a. Two area samples outside the work area in uncontaminated areas of the building, remote from the decontamination facilities.
      - (1) Primary location selection shall be within 10 feet of isolation barriers.
      - (2) Where negative ventilation exhaust runs through uncontaminated building areas, one of the area samples will be required in these areas to monitor any potential fiber release.
      - (3) Where exhaust tubes have been grouped together in banks of up to five (5) tubes, with each tube exhausting separately and the bank of tubes terminating together at the same controlled area, one area air sample shall be taken.
    - b. One area sample within the uncontaminated entrance to each decontamination enclosure system.
    - c. Where adjacent non-work areas do not exist, an exterior area sample shall be taken.
    - d. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct.
    - e. One area sample outside, but within 25 feet of, the building or structure, if the entire building or structure is the work area.

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2. For large asbestos projects involving interior foam method, area air sampling shall be performed at the following sampling locations:
  - a. One area sample taken outside the work area within 10 feet of isolation barriers.
  - b. One area sample taken within the uncontaminated entrance to each worker decontamination and waste decontamination enclosure system.
  - c. One area sample within 5 feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors but not within a duct, if applicable.
  - d. Three area samples inside the work area.
  - e. One area sample where the negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.
3. For large asbestos projects employing the glovebag procedure within a tent, a minimum of five continuous air samples shall be taken concurrently with the abatement for each work area, unless there are more than three enclosures, in which case two area samples per enclosure are required.
  - a. Four area samples taken outside the work area within ten feet of tent enclosure(s).
  - b. One area sample taken within the uncontaminated entrance to each worker and waste decontamination enclosure system.
  - c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.
  - d. One area sample where negative ventilation exhaust ducting runs through uncontaminated building areas, if applicable.
4. For large asbestos projects involving exterior foam method or removal of ACM from vertical surfaces, a minimum of five continuous area samples shall be taken concurrently with the abatement for each work area using the following minimum requirements:
  - a. Three area samples inside the work area and remote from the decontamination systems.

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- b. One area sample within the uncontaminated entrance to each worker and waste decontamination enclosure system.
  - c. One area sample outside the work area within 25 feet of the building or structure, if the entire building or structure is the work area.
  - d. One area sample inside the building or structure at the egress point to the work area, if applicable.
5. For small asbestos projects employing full containment, a minimum of three continuous area samples shall be taken concurrently with the abatement for each work area at the following locations:
- a. Two area samples taken outside the work area within ten feet of the isolation barriers.
  - b. One area sample within the uncontaminated entrance to each worker or waste decontamination enclosure system.
  - c. One area sample within five feet of the unobstructed exhaust from a negative pressure ventilation system exhausting indoors, but not within a duct, if applicable.
  - d. One area sample where negative ventilation exhaust ducting runs through an uncontaminated building area, if applicable.
6. Tent Procedures:  
For projects involving more than 25 linear feet or 10 square feet, a minimum of three continuous samples shall be taken concurrently throughout abatement.
- J. Post-abatement clearance air monitoring for projects not solely employing glove-bag procedures shall include a minimum number of area samples inside each homogeneous work area and outside each homogeneous work area (five samples inside/five samples outside for Large Projects and three samples inside/three samples outside for Small Projects). In addition to the five sample inside/five sample outside minimum for Large Projects, one additional representative area sample shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.
- K. Post-abatement clearance air monitoring for Small Projects solely employing glove-bag procedures is not required unless one or more of the following events occurs. In such cases, post-abatement clearance air monitoring procedures shall be followed. The events requiring post-abatement clearance air monitoring are:
- 1. The integrity of the glove-bag was compromised,

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2. Visible emissions are detected outside the glove-bag, and/or
  3. Ambient levels exceed 0.01 f/cc during abatement.
- L. Monitoring requirements for other than post-abatement clearance air monitoring are as follows:
1. The sampling zone for indoor air samples shall be representative of the building occupants' breathing zone.
  2. If possible, outdoor ambient and baseline samplers should be placed about 6 feet above the ground surface in reasonable proximity to the building and away from obstructions and drafts that may unduly affect airflow.
  3. For outdoor samples, if access to electricity and concerns about security dictate a rooftop site, locations near vents and other structures on the roof that would unduly affect airflow shall be avoided.
  4. Air sampling equipment shall not be placed in corners of rooms or near obstructions such as furniture.
  5. Samples shall have a chain of custody record.
- M. Area air sampling during abatement shall be conducted as specified in the following documents except as restricted or modified herein:
1. Measuring Airborne Asbestos Following an Abatement Action, US EPA document 600/4-85-049 (Nov., 1985);
  2. Guidance for Controlling Asbestos-Containing Materials in Buildings; US EPA Publication 560/5-85- 024 (June, 1984);
  3. Methodology for the Measurement of Airborne Asbestos by Electron Microscopy US EPA Contract No. 68-02- 3266;
  4. Mandatory and non-mandatory Electron Microscopy Methods set forth in 40 CFR Part 763, Subpart E, Appendix A.
  5. NIOSH 7400 method using "A" counting rules

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N. In accordance with the above criteria, area samples (see NYCDEP Asbestos Control Program Regulations) shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM, 25mm cassettes	560 liters	5 to 15 liters/minute
TEM, 25mm cassettes	560 liters	1 to 10 liters/minute
TEM, 37mm cassettes	1,250 liters	1 to 10 liters/minute

O. Post-abatement clearance air monitoring requirements are as follows:

1. Sampling shall not begin until at least one hour after wet cleaning has been completed and no visible pools of water or condensation remain.
2. Samplers shall be placed at random around the work area. If the work area contains the number of rooms equivalent to the number of required samples based on floor area, a sampler shall be placed in each room. When the number of rooms is greater than the required number of samples, a representative sample of rooms shall be selected.
3. The representative samplers placed outside the work area but within the building shall be located to avoid any air that might escape through the isolation barriers and shall be approximately 50 feet from the entrance to the work area, and 25 feet from the isolation barriers.

P. The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:

1. Before starting the sampling pumps, use forced air equipment (such as a one horsepower leaf blower) to direct exhaust air against all walls, ceilings, floors, ledges and other surfaces in the work area. This pre-sampling procedure shall take at least five minutes per 1,000 square feet of floor area; then
2. Place a 20-inch diameter fan in the center of the room. Use one fan per 10,000 cubic feet of room space. Place the fan on slow speed and point it toward the ceiling.
3. Start the sampling pumps and sample for the required time or volume.
4. Turn off the pump and then the fan(s) when sampling is completed.

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5. Collect a minimum number of area samples inside and outside each homogeneous work area (five inside/five outside samples for Large Projects and three inside/three outside samples for Small Projects). In addition to the minimum for Large Projects, one representative area samples shall be collected inside and outside the work area for every 5,000 square feet above 25,000 square feet of floor space where ACM has been abated.

Q. For post-abatement monitoring, area samples shall conform to the following schedule:

Area Samples for Analysis by	Minimum Volume	Flow Rate
PCM	1,800 liters	5 to 15 liters/minute
TEM	1,250 liters	1 to 10 liters/minute

1. Each homogeneous work area that does not meet the clearance criteria shall be thoroughly re-cleaned using wet methods, with the negative pressure ventilation system in operation. New samples shall be collected in the work area as described above. The process shall be repeated until the work site meets the clearance criteria.
2. For an asbestos project with more than one homogeneous work area, the release criterion shall be applied independently to each work area.
3. Should airborne fiber concentrations exceed the clearance criteria, the Contractor shall re-clean the work area utilizing wet wiping and HEPA-vacuuming techniques. Following completion of re-cleaning activities, the Third-Party Air Monitor will perform an observation of the Work Area. If the Third-Party Air Monitor determines that the work was performed in accordance with the specifications, the appropriate settling period will be observed and additional air sampling will be performed.
4. All costs resulting from additional air tests and observations shall be borne by the Contractor. These costs may include, but are not limited to, labor, analysis fees, materials, and expenses.
5. After the area has been found to be in compliance, the Contractor may remove Isolation Barriers and perform final cleaning as specified.

R. Clearance and/or Re-occupancy Criteria:

1. The clearance criteria shall be applied to each homogeneous work area independently.
2. For PCM analysis, the clearance air monitoring shall be considered satisfactory when each of the 5 inside/5 outside samples for Large Projects

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and/or 3 inside/3 outside samples for Small Projects is less than or equal to 0.01 f/cc or the background concentrations, whichever is greater.

3. For TEM analysis, the clearance air monitoring shall be considered satisfactory when the requirements stated in 40 CFR Part 763, Subpart E, Appendix A, Section IV are met.
4. As soon as the air monitoring tests are completed, the Third-Party Air Monitor will send the results of such tests to the City and notify the Contractor.
5. The Contractor shall initiate the appropriate closeout information into the DEP ARTS database within 24 hours of work area completion to allow the Third Party Air Monitoring Firm to complete and submit the ACP-15 forms for each specific work area.
6. The Contractor shall provide the ACP-20 and ACP-21 forms to the Third Party Air Monitoring Firm within 48 hours of receipt.

### 1.19 TAMPERING WITH TEST EQUIPMENT

All parties to this Contract are hereby notified that any tampering with testing equipment will be considered an attempt at falsifying reports and records to federal and state agencies and each offense will be prosecuted under applicable state and federal criminal codes to the fullest extent possible.

### 1.20 GUARANTEE

- A. Work performed in compliance with this Contract shall be guaranteed for a period of one year from the date the completed work is accepted by the City.
- B. The Contractor shall not be held liable for the guarantee where the repair required under the guarantee is a result of obvious abuse or vandalism, as determined by the Commissioner.
- C. The City will notify the Contractor in writing regarding defects in work under the guarantee.

## PART 2 – PRODUCTS

### 2.01 MATERIAL HANDLING

- A. Deliver all materials to the job site in their manufacturer's original container, with the manufacturer's label intact and legible.
  1. Maintain packaged materials with seals unbroken and labels intact until time of use.

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2. Store all materials on pallets, away from any damp and/or wet surface. Cover materials in order to prevent damage and/or contamination.
  3. Promptly remove damaged materials and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the City.
- B. The Construction Project Manager may reject as non-complying such material and products that do not bear identification satisfactory to the Construction Project Manager as to manufacturer, grade, quality and other pertinent information.

### 2.02 MATERIALS

- A. Wetting agents: (Surfactant) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-hazardous. Surfactants shall be installed according to the manufacturer's written instructions.
- B. Encapsulants: Liquid material which can be applied to asbestos-containing material which temporarily controls the possible release of asbestos fibers from the material or surface either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.
- C. During abatement activities, replacement materials shall be stored outside the work area in a manner to prevent contamination. Materials required for the asbestos project (i.e., plastic sheeting, replacement filters, duct tape, etc.) shall be stored to prevent damage or contamination.
- D. Framing Materials and Doors: As required to construct temporary decontamination facilities and isolation barriers. Lumber shall be high grade, new, finished one side and fire retardant.
- E. Fire Retardant Polyethylene Sheeting: minimum uniform thickness of 6-mil. Provide largest size possible to minimize seams. All materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.
- F. Fire Retardant Reinforced Polyethylene Sheeting: For covering floor of decontamination units, provide translucent, nylon reinforced or woven polyethylene laminated, fire retardant polyethylene sheeting. Provide largest size possible to minimize seams, minimum uniform thickness 6-mil. All materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

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- G. Drums: Asbestos-transporting drums, sealable and clearly marked with warning labels as required by OSHA and EPA.
- H. Polyethylene Disposal Bags: Asbestos disposal bags, minimum of fire retardant 6-mil thick. Bags shall be clearly marked with warning labels as required by OSHA and EPA.
- I. Signs: Asbestos warning signs for posting at perimeter of Work Area, as required by OSHA and EPA.
- J. Waste Container Bag Liners and Flexible Trailer Trays: One piece leak-resistant flexible tray with absorbent pad.
- K. Tape: Provide tape which is of high quality with an adhesive that is formulated to aggressively stick to sheet polyethylene.
- L. Spray Adhesive: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.
- M. Flexible Duct: Spiral reinforced flex duct for air filtration devices.
- N. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves, and 18-inch high boot-type foot covers. Protective clothing shall conform to OSHA Standard 29 CFR 1926.1101.
- O. Surfactants, strippers, sealers, or any other chemicals used shall be non-carcinogenic and non-toxic.
- P. Materials used in the construction of temporary enclosures shall be noncombustible or fire-retardant in accordance with NFPA 701 and 255.

### 2.03 TOOLS AND EQUIPMENT

- A. Air Filtration Device (AFD): AFDs shall be equipped with High Efficiency Particulate Air (HEPA) filtration systems and shall be approved by and listed with Underwriter's Laboratory.
- B. Scaffolding: All scaffolding shall be designed and constructed in accordance with OSHA (29 CFR 1926/1910), New York City Building Code, and any other applicable federal, state and local government regulations. Whenever there is a conflict or overlap of the above references the most stringent provisions are applicable. All scaffolding and components shall be capable of supporting without failure a minimum of four times the maximum intended load, plus an allowance for impact. All scaffolding and staging must be certified in writing by a Professional Engineer licensed to practice in the State of New York.

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1. Equip rungs of all metal ladders, etc., with an abrasive, non-slip surface.
  2. Provide non-skid surface on all scaffold surfaces subject to foot traffic. Scaffold ends and joints shall be sealed with tape to prevent penetration of asbestos fibers.
- C. Transportation Equipment: Transportation Equipment, as required, shall be suitable for loading, temporary storage, transit and unloading of asbestos contaminated waste without exposure to persons or property. Any temporary storage containers positioned outside the building for temporary storage shall be metal, closed and locked.
- D. Vacuum Equipment: All vacuum equipment utilized in the Work Area shall utilize HEPA filtration systems.
- E. Vacuum Attachments: Soft Brush Attachment, Asbestos Scraper Tool, Drill Dust Control Kit.
- F. Electric Sprayer: An electric airless sprayer suitable for application of encapsulating material and shall be approved by and listed with Underwriters Laboratory.
- G. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for amended water application.
- H. Water Atomizer: Powered air-misting device equipped with a ground fault interrupter and equipped to operate continuously.
- I. Brushes: All brushes shall have nylon bristles. Wire brushes are excluded from use due to their potential to shred asbestos fibers into small, fine fibers. Wire brushes maybe used for cleaning pipe joints within glove-bags upon written approval of the Construction Project Manager.
- J. Power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation. Abrasive removal methods, including the use of beadblasters, are prohibited.
- K. Other Tools and Equipment: Contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, sponges, rounded-edge shovels, brooms, and carts.
- L. Fans and Leaf Blower: Provide Leaf Blower (one leaf blower per floor) and one 20-inch diameter fans for each 10,000 cubic feet of Work Area volume to be used for aggressive sampling technique for clearance air testing.

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- M. Fire Extinguishers: At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.
- N. First Aid Kits: Contractor shall maintain adequately stocked first aid kits in the clean rooms of the decontamination units and within Work Areas. The first aid kit shall be approved by a licensed physician for the work to be performed under this Contract.
- O. Water Service:
1. Temporary Water Service Connection: All connections to the Facilities water system shall include back flow protection. Valves shall be temperature and pressure rated for operation of the temperature and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping, and equipment. Leaking or dripping fittings/valves shall be repaired and or replaced as required.
  2. Water Hoses: Employ new heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each Work Area and to each Decontamination Enclosure Unit. Provide fittings as required for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.
  3. Water Heater: Provide UL rated 40-gallon electric water heaters to supply hot water for Personal Decontamination Enclosure System Shower. Activate from 30 Amp Circuit breakers located within the Decontamination Enclosure sub panel. Provide relief valve compatible with water heater operations, pipe relief valve down to drip pan at floor level with type 'L' copper piping. Drip pans shall be 6-inch deep and securely fastened to water heater. Wiring of the water heater shall comply with NEMA, NECA, and UL standards.
- P. Electrical Service:
1. General: Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.
  2. Temporary Power: Provide service to decontamination unit sub panel with minimum 60 AMP, two pole circuit breaker or fused disconnect connected to the building's main distribution panel. Sub panel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work.

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3. Voltage Differences: Provide identification warning signs at power outlets that are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.
4. Ground Fault Protection: Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate the GFCIs outside the Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for all circuits to be used for any purpose in Work Area, decontamination units, exterior, or as otherwise required by NEC, OSHA or other authority.
5. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead, and rise vertically where wiring will be least subject to damage from operations.
6. Temporary Wiring: In the Work Area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. Provide liquid tight enclosures or boxes for all wiring devices. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors.
7. Electrical Power Cords: Use only grounded extension cords; use hard service cords where exposed to traffic and abrasion. Use single lengths of cords only.
8. Temporary Lighting: All lighting within the Work Area shall be liquid and moisture proof and designed for the use intended.
  - a. Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.
  - b. Provide lighting in the Decontamination Unit as required to supply a minimum 50-foot candle light level.
9. If electrical circuits, machinery, and other electrical systems in or passing though the work area must stay in operation due to health and safety requirements, the following precautions must be taken:
  - a. All unprotected cables, except low-voltage (less than 24 volts) communication and control system cables, panel boxes of cables and joints in live conduit that run through the work area shall be covered with three (3) independent layers of six (6) mil fire retardant polyethylene. Each layer shall be individually duct taped and sealed.

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All three (3) layers of polyethylene sheeting shall be left in place until satisfactory clearance air sampling results have been obtained.

### 2.04 CLEANING

- A. Throughout the construction period, the Contractor shall maintain the building as described in this Section.
  - 1. The Contractor shall prevent building areas other than the Work Area from becoming contaminated with asbestos-containing dust or debris. Should areas outside the Work Area become contaminated with asbestos-containing dust or debris as a consequence of the Contractor's work practices, the Contractor shall be responsible for cleaning these areas in accordance with the procedures appended in Title 15, Chapter 1 of RCNY and NYSDOL ICR56. All costs incurred in cleaning or otherwise decontaminating non-Work Areas and the contents thereof shall be borne by the Contractor at no additional cost to the City.
  - 2. The Contractor shall provide to all personnel and laborers the required equipment and materials needed to maintain the specified standard of cleanliness.
- B. General
  - 1. Waste water from asbestos removal operations, including shower water, may be discharged into the public sewer system only after approved filtration is on operation to remove asbestos fibers.
  - 2. Asbestos wastes shall be double bagged in six mil (.006") fire retardant polyethylene bags approved for ACM disposal and shall be properly labeled and handled before disposal.
  - 3. All waste generated shall be bagged, wrapped or containerized immediately upon removal. The personal and waste decontamination enclosure systems and floor and scaffold surfaces shall be HEPA vacuumed and wet cleaned at the end of each work shift at a minimum.
  - 4. The Contractor shall use corrugated cartons or drums for disposal of asbestos-containing waste having sharp edged components (e.g., nails, screws, metal lathe and tin sheeting) that may tear polyethylene bags and sheeting. The waste within the drums or cartons must be double bagged.
  - 5. The Contractor shall transport all bags of waste to disposal site in thirty gallon capacity metal or fiber drums with tight lids, or in locked steel dumpster.
  - 6. Dumping of debris, waste or bagged waste will not be permitted.

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7. The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal. When the worker decontamination enclosure shower room alternates as a waste container wash room, the shower room shall be washed immediately with cloths or mops saturated with a detergent solution prior to wet cleaning.
8. Excessive water accumulation or flooding in the work area shall require work to stop until the water is collected and disposed of properly.
9. ACM shall be collected utilizing rubber dust pans and rubber squeegees.
10. HEPA vacuums shall not be used on wet materials unless specifically designed for that purpose.
11. Metal shovels shall not be used within the work area.
12. Mastic solvent when used will be applied in moderation (e.g., by airless sprayer). Saturation of the concrete floor with mastic solvent must be avoided.
13. The Contractor shall retain all items in the storage area in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection of all materials.
14. The Contractor shall not allow accumulation of scrap, debris, waste material, and other items not required for use in this work. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with New York City Department of Sanitation (NYCDOS) regulation Title 16 Chapter 8, and Federal, State and City laws.
15. At least twice a week (more if necessary), the Contractor shall completely remove all scrap, debris and waste material from the job site.
16. The Contractor shall provide adequate storage space for all items awaiting removal from the job site, observing all requirements for fire protection and concerns for the environment.
17. All respiratory protection equipment shall be selected from the latest NIOSH Certified Equipment list.
18. Daily and more often, if necessary, the Contractor shall inspect the Work Areas and adjoining spaces, and pick up all scrap, debris, and waste material. All such items shall be removed to the place designated for their storage.

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19. Weekly, and more often, if necessary, the Contractor shall inspect all arrangements of materials stored on the site; re-stack and tidy them or otherwise service them to meet the requirements of these Specifications.
20. The Contractor shall maintain the site in a neat and orderly condition at all times.

### PART 3 – EXECUTION

#### 3.01 WORKER DECONTAMINATION FACILITY

##### A. Large Asbestos Projects (Small Project Option):

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas
  - a. Structure:
    - (1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.
    - (2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame work shall be lined with minimum 3/8" thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.
    - (3) Interior shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of twelve inches.
    - (4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered to allow for air movement through the decontamination units into Work Area.
  - b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.

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- c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.
- d. Decontamination Enclosure System shall be placed adjacent to the Work Area and shall consist of three totally enclosed chambers, separated from Work Area and each other by airlocks, as follows:
  - (1) Equipment Room: The equipment room shall have a curtain doorway to separate it from the Work Area, and share a common airlock with the shower room. The equipment room shall be large enough to accommodate at least one worker (allowing them enough room to remove their protective clothing and footwear), and a fire retardant 6-mil disposal bag for collection of discarded clothing and equipment. The equipment room shall be utilized for the storage of equipment and tools after decontamination using a HEPA-vacuum and/or wet cleaning. A one-day supply of replacement filters, in sealed containers, for HEPA-vacuums and negative air machines, extra tools, containers of surfactant, and other materials and equipment required for the project shall be stored here. A walk-off pan filled with water shall be placed in the Work Area just outside the equipment room for persons to clean foot coverings when leaving the Work Area. Contaminated footwear and reusable work clothing shall be stored in this room.
  - (2) Shower Room: The shower room shall have two airlocks (one that separates it from the equipment room and one that separates it from the clean room). The shower room shall contain at least one shower, with hot and cold water adjustable at the tap, per six workers. Careful attention shall be given to the shower to ensure against leaking of any kind and shall contain a rigid catch basin at least six inches deep. Contractor shall supply towels, shampoo and liquid soap in the shower room at all times. Shower water shall be continuously drained, collected, and filtered through a system with at least a 5-micron particle size collection capacity. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filters by large particles. Pumps shall be installed, maintained and utilized in accordance with manufacturer's recommendations. Filtered water shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.
  - (3) Clean Room: The clean room shall share a common airlock with the shower room and shall have a curtained doorway to separate it from outside non-contaminated areas. Lockers, for

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storage of workers' street clothing, and shelves, for storing respirators, shall be provided in this area. Clean disposable clothing, replacement filters for respirators, and clean dry towels shall be provided in the clean room. The clean room shall not be used for the storage of tool, equipment or other materials.

### B. Small Asbestos Projects:

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.
2. The worker decontamination enclosure system shall consist of, as a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.
3. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

- C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Contractor, and as specified herein.

### 3.02 WASTE DECONTAMINATION FACILITY

#### A. Large Asbestos Project (Small Project Option)

1. Provide a worker decontamination facility in accordance with, Title 15, Chapter 1, OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein. Unless approved by NYCDEP and the City, worker decontamination facilities shall be attached to the Work Areas.
  - a. Structure:
    - (1) Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 16 inches on-center.
    - (2) When worker decontamination unit is located outdoors, in areas with public access, or in correctional facilities, frame

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work shall be lined with minimum 3/8" thickness fire rated plywood sheathing. Sheathing shall be caulked or taped airtight at all joints and seams.

- (3) Interior walls shall be covered with two layers of fire retardant 6-mil polyethylene sheeting, with a minimum overlap of 12 inches at seams. Seal seams airtight using tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant polyethylene sheeting with a minimum overlap on the walls of twelve inches.
  - (4) Entrances to the decontamination unit shall be secured with lockable hinged doors. Doors shall be open at all times when abatement operations are in progress. Doors shall be louvered to allow for air movement through the decontamination units into the Work Area.
- b. Curtained Doorways: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.
  - c. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.
  - d. Decontamination Enclosure System shall be located outside the work area and attached to all locations through which ACM waste will be removed from the work area and shall consist of two totally enclosed chambers, separated from the Work Area and each other by airlocks, as follows:
    - (1) Washroom: An equipment washroom shall have two air locks (one separating the unit from the Work Area and one common air lock that separates it from the holding area). The washroom shall have facilities for washing material containers and equipment. Gross removal of dust and debris from contaminated material containers and equipment shall be accomplished in the Work Area, prior to moving to the washroom.
    - (2) Holding Area: A holding area shall share a common air lock with the equipment washroom and shall have a curtained doorway to outside areas. A hinged, lockable door shall be placed at the holding area entrance to prevent unauthorized access into the Work Area.

B. Small Asbestos Project:

1. The worker decontamination enclosure system shall consist of, as a minimum, an equipment room, a shower room, and a clean room separated from each other and from the work area by curtained doorways. The equipment storage, personnel gross decontamination and removal of disposal clothing shall occur in the equipment room prior to entering the shower. All other requirements shall be the same as described above for a large asbestos project.
2. For small asbestos projects with only one exit from the work area, the shower room may be used as a waste washroom. The clean room shall not be used for waste storage. All other requirements shall be the same as described above for a large asbestos project.

C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Contractor, and as specified herein.

**3.03 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING REMOTE DECONTAMINATION FACILITIES**

- A. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall fully identify the facility, agents, contractor(s), the project, each Work Area, and worker respiratory protection employed. The job supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.
- B. Each worker shall remove street clothes in the clean room; wear two disposable suits, including gloves, hoods and non-skid footwear; and put on a clean respirator (with new filters) before entering the Work Area.
- C. Each worker shall, before leaving the Work Area or tent, clean the outside of the respirators and outer layer of protective clothing by wet cleaning and/or HEPA-vacuuming. The outer disposable suit shall be removed in the airlock prior to proceeding to the Worker Decontamination Unit. The inner disposable suit and respirator shall be wet wiped and HEPA vacuumed thoroughly before removing and prior to aggressive shower.
- D. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately.

**3.04 PERSONNEL ENTRANCE AND DECONTAMINATION PROCEDURES FOR REMOVAL OPERATIONS UTILIZING ATTACHED DECONTAMINATION FACILITIES**

- A. All workers and authorized visitors shall enter the Work Area through the worker decontamination facility.
- B. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, contractor(s), the project, each Work Area and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity. The log shall be submitted to the NYC DDC within 48 hours of request.
- C. Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator with filters, and clean protective clothing before entering the Work Area through the shower room and equipment room.
- D. Each worker or authorized visitor shall, each time he leaves the Work Area, remove gross contamination from clothing before leaving the Work Area; proceed to the equipment room and remove clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.
- E. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately. Disposable clothing of the type worn inside the Work Area is not permitted outside the Work Area.

**3.05 MAINTENANCE OF DECONTAMINATION ENCLOSURE FACILITIES AND BARRIERS**

The following procedures shall be followed during abatement activities.

- A. All polyethylene barriers inside the work place and partitions constructed to isolate the Work Area from occupied areas shall be inspected by the asbestos handler supervisor at least twice per shift.
- B. Smoke tubes shall be used to test the integrity of the Work Area barriers and the decontamination enclosure systems daily before abatement activity begins and at the end of each shift.

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- C. Damage and defects in the decontamination enclosure system shall be repaired immediately upon discovery. The decontamination enclosure system shall be maintained in a clean and sanitary condition at all times.
- D. At any time during the abatement activity, if visible emissions are observed, or elevated asbestos fiber counts outside the Work Area are measured, or if damage occurs to barriers, abatement shall stop. The source of the contamination shall be located, the integrity of the barriers shall be restored and extended to include the contaminated area, and visible residue shall be cleaned up using appropriate HEPA-vacuuming and wet cleaning.
- E. Inspections and observations shall be documented in the daily project log by the asbestos handler supervisor.
- F. The daily inspection to ensure that exits have been checked against exterior blockage or impediments to exiting shall be documented in the log book. If exits are found to be blocked, abatement activities shall stop until the blockage is cleared.

### 3.06 MODIFICATIONS TO HVAC SYSTEMS

- A. Shut down, isolate or seal, all existing HVAC units, fans, exhaust fans, perimeter convection air units, supply and/or return air ducts, etc., situated in, traversing or servicing the work zone.
- B. Seal all seams with duct tap. Wrap entire duct with a minimum of two layers of fire retardant 6-mil polyethylene sheeting. All shutdowns are to be coordinated with the Facility. Where systems must be maintained, i.e., traversing Work Areas to non-Work Areas, only supply ducts will be maintained, protect as described above. All returns must be blanked off in Work Area and adjacent areas, including floor above and below Work Area. When required Contractor shall apply for a clarification from NYCDEP. The Contractor shall implement the following engineering procedures:
  - 1. Maintenance of a positive pressure within the HVAC system of 0.01 inch water gauge (or greater) with respect to the ambient pressure outside the Work Area. The conditions for this system shall be maintained and be operational 24 hours per day from the initiation of Work Area preparation until successful final air clearance. Positive pressurization of HVAC system shall be applied only under the direction and control of professional engineer, or other knowledgeable licensed professional;
  - 2. The positive pressurization of the duct shall be tested, inspected and recorded both at the beginning and at the end of each shift;

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3. The positive pressurization shall be monitored using instrumentation which will provide a written record of pressurization and that will trigger an audible alarm, if the static pressure falls below the set value;
  4. The supply air fan and the supply air damper for the active positive-pressurized duct shall be placed in the manual "on" positions to prevent shutdown by fail-safe mechanisms;
  5. The return air fan and the return air dampers shall be shut down and locked-out;
  6. All the seams of the HVAC ducts that pass through the Work Area shall be sealed;
  7. The HVAC ducts that pass through the Work Area shall be covered with two (2) layers of fire retardant 6-mil polyethylene sheeting, and all seams and edges of both layers shall be sealed airtight;
  8. The supply air fans, return air fans, and all dampers servicing the Work Area itself shall be shut down and locked-out. All openings within the Work Area of supply and return air ducts shall be sealed with 3/8-inch fire rated plywood and two layers of fire retardant 6-mil polyethylene;
  9. When abatement occurs during periods while the HVAC system is shut down an alternative method of pressurization of the duct passing through the Work Area should be employed (e.g., by low-pressure "blowers", etc., directly coupled into the duct). Item #4 above shall be deleted and shall be replaced by the requirement to set the dampers of the HVAC duct in the manual closed positions, in order to effect pressurization.
- C. Contractor to coordinate this item with the Facility and Construction Project Manager at the commencement of work. Where present HVAC systems (ducts) service an area and that air system cannot be shut down, Contractor shall isolate and seal the ducts, both supply and return, at the boundary of that zone.
1. To isolate, cap, or seal a duct, the Contractor shall remove insulation from duct (if necessary), then disconnect linkage to fold shut all fire dampers. Contractor shall seal all edges and seams with caulk and duct-tape.
  2. Contractor shall then cut existing duct and fold metal in and secure with approved fasteners. Contractor shall caulk and duct-tape all seams and edges.
  3. All ducts shall then be completely wrapped and sealed with duct-tape and three (3) layers of reinforced polyethylene sheeting.
  4. All ducts shall be restored to original working order at the end of the project.

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- D. Where present HVAC systems (ducts) service occupied areas (non-Work Areas), the Contractor shall blank off the ducts.
1. To isolate or seal the return duct, the Contractor shall remove any insulation (if necessary) from the duct. Then disconnect linkage to fold shut all fire dampers and insert a fiberglass board within the duct. Contractor shall seal all edges and seams with caulk, duct-tape and three (3) layers of reinforced polyethylene sheeting.
  2. All isolation of return ducts and any other activity that requires removal of ceiling by the Contractor shall be conducted under controls. Work is to be coordinated with the Construction Project Manager and the Facility and is described as follows:
    - a. Work shall occur as scheduled.
    - b. Horizontal surfaces near the blanking operations shall be protected with fire retardant 6-mil polyethylene sheeting.
    - c. Plastic drapes shall be used to enclose the immediate area.
    - d. Contractor to position and operate air filtration devices and HEPA-vacuums in the area to clean space after blanking operations.
    - e. All personnel involved with this work shall receive personal protection (i.e., respirators and disposable suits).
- E. Upon loss of negative pressure or electric power, all work activities in an area shall cease immediately and shall not resume until negative pressure and/or electric power has been fully restored. When a power failure or loss of negative pressure lasts, or is expected to last, longer than thirty (30) minutes, the following sequence of events shall occur.
1. All make up air inlets shall be sealed airtight.
  2. All decontamination facilities shall be sealed airtight after evacuation of all personnel from the Work Area.
  3. All adjacent areas shall be monitored for potential fiber release upon discovery of and subsequently throughout, power failure.

### **3.07 LOCKOUT OF HVAC SYSTEMS, ELECTRIC POWER, AND ACTIVE BOILERS**

Prior to the start of any prep work, the Contractor shall employ skilled tradesmen with limited asbestos licenses for the following work:

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- A. Disable all ventilating systems or other systems bringing air into or exhausting air out of the Work Area. Disable system by disconnecting wires removing circuit breakers, by lockable switch or other positive means to ensure against accidental re-starting of equipment.
- B. Lock out power to the Work Area by switching off all breakers and removing them from panels or by switching and locking entire panel. Label panel with following notation: "DANGER CIRCUIT BEING WORKED ON". Give all keys to Facility.
- C. Lock out power to circuits running through Work Area whenever possible by switching off and removing breakers from panel. If circuits must remain live, the Facility shall notify Contractor in order that he may secure a variance from NYCDEP. The Contractor shall protect all conduit and wires to remain and label all active circuits at intervals not to exceed 3 feet with tags having the following notation: "DANGER LIVE ELECTROCUTION HAZARD". The Contractor shall label all circuits in all locations including hidden locations that may be affected by the work in a similar manner.
- D. All boilers and other equipment within the work area shall be shut down, locked out, tagged out and the burner/boiler/equipment accesses and openings shall be sealed until abatement activities are complete. If the boiler or other exhausted equipment will be subject to abatement, all breeching, stacks, columns, flues, shafts, and double-walled enclosures serving as exhausts or vents shall be segregated from the affected boiler or equipment and sealed airtight to eliminate potential chimney effects within the work area.

### PART 4 – PREPARATION OF WORK AREA AND REMOVAL PROCEDURES

#### 4.01 REMOVAL OF ASBESTOS-CONTAINING MATERIAL

##### A. Contractor Responsibility

Contractor shall be responsible for the proper removal of ACM from the Work Area using standard industry techniques. The Third-Party Air Monitor representative shall observe the Work.

- 1. General Requirements:
  - a. Removal of ACM shall be performed using wet methods. Dry removal of ACM is prohibited.
  - b. Spray ACM with amended water with sufficient frequency and quantity to enhance penetration. Sufficient time shall be allowed for amended water to penetrate the material to the substrate prior to removal. All ACM shall be thoroughly wetted while work is being conducted.

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- c. Accumulation of standing water on the floor of the Work Area is prohibited.
- d. Apply removal encapsulants, when used, in accordance with the manufacturer's recommendations and guidelines.
- e. Containerize ACM immediately upon detachment from the substrate. Alternately, ACM may be dropped in to a flexible catch basin and promptly bagged. Detached ACM is not permitted to lie on the floor for any period of time. Excess air within the bag shall be removed before sealing. ACM shall not be dropped from a height of greater than 10 feet. Above 10 feet, dust free inclined chutes may be used. Maximum inclination from horizontal shall be 60-degrees for all chutes.
- f. Exits from the work area shall be maintained, or alternative exits shall be established, in accordance with section 1027 of the New York City Fire Code. Exits shall be checked at the beginning and end of each work shift against blockage or impediments to exiting.
- g. Signs clearly indicating the direction of exits shall be maintained and prominently displayed within the work area.
- h. No smoking signs shall be maintained and prominently displayed within the work place.
- i. At least one fire extinguisher with a minimum rating 2-A:10-B:C shall be required for each work place. In the case of large asbestos projects, at least two such fire extinguishers shall be required.
- j. If the containment area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell, or at a secured location in the ground floor lobby when conditions warrant. The required switch or switches shall be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors the cut off switch shall be able to turn off the equipment on all floors.

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### B. Removal of ACM Utilizing Full Containment Procedures shall be as follows:

#### 1. Preparation Procedures:

- a. Ensure that the Third-Party Air Monitor has performed area monitoring and established a background count prior to the preparatory operations for each removal area, as applicable.
- b. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC components shall be sealed with tape and two layers of fire retardant polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos-asbestos contaminated waste.
- c. Shut down, disconnect, and lock out or tag all electric power to the Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.
- d. Provide and install decontamination enclosure systems in accordance with Sections 3.01 and 3.02 of this Section.
- e. Remove ACM that may be disturbed by the erection of partitions using tent procedures and wet removal methods. Removal shall be limited to a one-foot wide strip running the length/height of the partition.
- f. Pre-clean and remove moveable objects from the Work Area. Pre-cleaning shall be accomplished using HEPA-vacuum and wet-cleaning techniques. Store moveable objects at a location determined by the City.
- g. Protect carpeting that will remain in the Work Area.
  - (1) Pre-clean carpeting utilizing wet-cleaning techniques.
  - (2) Install a minimum of two layers of fire retardant 6-mil reinforced polyethylene sheeting over carpeting.
  - (3) Place a rigid flooring material, minimum thickness of 3/8-inch, over polyethylene sheeting.
- h. Pre-clean all fixed objects to remain within the Work Area using HEPA-vacuum and wet-cleaning techniques.

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- i. Seal fixed objects with two individual layers, minimum, of 6-mil fire retardant polyethylene sheeting.
- j. Pre-clean entire Work Area utilizing HEPA-vacuum and wet-cleaning techniques. Methods of cleaning that raise dust; such as dry sweeping or use of vacuum equipment not equipped with HEPA-filters, is prohibited.
- k. Install isolation barriers (i.e., sealing of all openings, including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and other penetrations within the Work Area) using two layers of 6-mil fire retardant polyethylene sheeting and duct-tape.
- l. Construct rigid framework to support Work Area barriers.
  - (1) Framework shall be constructed using 2-inch by 4-inch wooden or metal studs placed 16 inch on center when existing walls and/or ceiling do not exist for all openings greater than 32 square feet. Framework is not required except where one dimension is one foot or less or the opening will be used as an emergency exit.
  - (2) Apply a solid construction material, minimum thickness of 3/8-inch to the Work Area side of the framing. In secure interior areas, not subject to access from the public or building occupants, an additional layer of 6-mil fire retardant polyethylene sheeting may be substituted for the rigid construction material.
  - (3) Caulk all wall, floor, ceiling, and fixture joints to form a leak tight seal.
- m. Seal floor drains, sumps, shower tubs, and other collection devices with two layers of 6-mil fire retardant plastic and fire rated plywood, as necessary, and provide a system to collect all water used by the Contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.
- n. Remove ceiling mounted objects not previously sealed that will interfere with removal operations. Mist object and surrounding ACM with amended water prior to removal to minimize fiber dispersal. Clean all moveable objects using HEPA-vacuum and wet-cleaning techniques prior to removal from the Work Area.

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- o. Fiberglass insulation with intact coverings shall be protected in place during abatement activities. These materials shall be protected with two layers of 6-mil fire retardant polyethylene sheeting as isolation barriers and two additional layers of 6-mil fire retardant polyethylene sheeting serving as primary and secondary surface barriers.
- p. Install and initiate operation of AFDs to provide a negative pressure and a minimum of four air changes per hour within the Work Area relative to surrounding non-Work Areas. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures. The use of HEPA-filtered vacuum to produce a negative air pressure inside the enclosure is prohibited.
- q. Maintain emergency and fire exits from the Work Areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the Work Area. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.
- r. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.
- s. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation.
- t. Prior to being plasticized, the Work Areas shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used.
- u. Plasticize the area after pre-cleaning, using the following procedures.
  - (1) Cover floors with one layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 6 inches up wall, and seal layer to wall.

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- (2) Cover walls with one layer of 6-mil fire retardant polyethylene sheeting, overlapping wall layer a minimum of 6 inches, and seal layer to floor layer.
  - (3) Cover floors with a second layer of 6-mil fire retardant polyethylene sheeting, turning layer a minimum of 12 inches up wall, and seal layer to wall.
  - (4) Cover walls with a second layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to floor layer.
  - (5) In areas where demolition is required to access ACM, a layer of fire retardant 6-mil reinforced polyethylene sheeting shall be placed on the floor of the enclosure.
  - (6) Perform demolition required to access ACM. Debris resulting from demolition activities shall be disposed of as ACM waste as described in this Specification.
  - (7) Repeat preparation of areas accessed by demolition activities as described above.
- v. Suspended ceiling tiles and T-grid components shall remain in place until the preparation of the Work Area below the ceiling tiles are completed and personnel and equipment decontamination enclosures have been constructed.
- w. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid Work Area surface.
- x. Means of egress shall not be obstructed by hardwall barriers.
- y. Pre-Removal Inspections.
- (1) Prior to removal of any ACM, the Contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.
  - (2) Contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.
  - (3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

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2. Removal of ACM Within Full Containment:
  - a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.
  - b. Remove the material using hand tools such as scrapers or putty knives. Wire-mesh or wood lathe reinforcing, when present, shall be cut into manageable pieces and disposed of as ACM.
  - c. Remove any residual material from the substrate using wet cleaning methods and nylon-bristled hand brushes.
  - d. Place the removal material immediately into a properly labeled fire retardant 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.
  - e. Following the completion of removal of insulation, all visible residue shall be removed from the substrate.
  
3. Following Removal of ACM utilizing Full Containment Procedures:
  - a. First Cleaning:
    - (1) Remove any visible accumulation of asbestos material and debris. HEPA-vacuumping and wet cleaning shall be performed on all surfaces inside the Work Area. All sealed drums, plastic bags, and equipment used in the Work Area shall be removed from the Work Area.
    - (2) Upon request of the Contractor, the Third-Party Air Monitor will perform a visual inspection. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.
    - (3) Remove first layer of plastic sheathing inside the Work Area. The isolation barriers and decontamination facility shall remain in place and be utilized.
  - b. Second Cleaning:
    - (1) After the first cleaning, the Work Area shall be vacated for twelve hours to allow fibers to settle.
    - (2) All objects and surfaces in the Work Area shall be HEPA - vacuumped and wet cleaned for a second cleaning.

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- (3) A thin coat of lockdown encapsulant shall be applied to all plastic covered surfaces in the Work Area.
- (4) When the encapsulant is dry, second layer of polyethylene sheeting on the walls, ceiling and floors shall be removed. Do not remove seals from doors, windows, Isolation Barriers or disconnect the negative pressure equipment.

c. Third Cleaning:

- (1) A minimum of four hours after the second cleaning, all the surfaces in the Work Area shall be HEPA-vacuumed and wet cleaned for a third cleaning.
- (2) Upon the request of the Contractor, the Third-Party Air Monitor will do final visual inspection for re-occupancy. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.
- (3) When the Work Area passes the Third-Party Air Monitor's visual re-occupancy inspection, air sampling shall not begin until at least one hour after the completion of the third cleaning. The Third-Party Air Monitor shall perform air monitoring using aggressive testing techniques. The Third-Party Air Monitor will approve re-occupancy if the specified fiber count in the Work Area is achieved according to the Third-Party Air Monitor.
- (4) When the Work Area passes the re-occupancy test, all controls and seals established shall be removed.
- (5) The cleaned layer of the surface barriers shall be removed from walls and floors.
- (6) The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area which were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.

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- d. Final Barrier Removal:
    - (1) Upon receipt of acceptable clearance testing results, polyethylene sheeting and Isolation Barriers shall be removed and disposed accordingly as asbestos-containing material.
    - (2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.
  - e. The Third-Party Air Monitor will conduct a final visual observation. Approval must be granted prior to break down of decontamination facility and contractor demobilization.
- C. Removal of ACM utilizing NYCDEP Title 15, Chapter 1 §1-106 Tent Containment Procedures and/or Tent and Glove-bag Procedures utilizing NYDEP Title 15, Chapter 1 §1-105 shall be as follows:
- 1. Preparation Procedures:
    - a. Ensure that the Third-Party Air Monitor has performed area monitoring and established a background count prior to the preparatory operations for each removal area, as applicable.
    - b. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC components shall be sealed with tape and two layers of polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos-asbestos contaminated waste.
    - c. Shut down, disconnect, and lock out or tag all electric power to the Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.
    - d. Provide and install decontamination enclosure systems in accordance with PART 3 - EXECUTION, Sections 3.01 and 3.02 of these Specifications. Decontamination facilities may be remote from the Work Areas.
    - e. Construct rigid framework to support Work Area barriers. Framework shall be constructed using 2-inch by 4-inch wooden or metal studs placed 16 inch on center when existing walls and/or ceiling do not exist.

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- f. Seal floor drains, sumps, shower tubs, and other collection devices with two layers of fire retardant 6-mil plastic and minimum 3/8" fire rated plywood, as necessary, and provide a system to collect all water used by the Contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer. Any opening greater than 32 square feet shall be framed with 2-inch by 4-inch studding placed 16 inches on center.
- g. Install and initiate operation of AFDs to provide a negative pressure and a minimum of four air changes per hour and negative pressure of -0.02" of water column within the Work Area relative to surrounding non-Work Areas. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures. The use of HEPA-filtered vacuums to produce a negative air pressure inside the enclosure is prohibited.
- h. Maintain emergency and fire exits from the Work Areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with florescent paint or other effective designations to permit easy location from anywhere within the Work Area. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.
- i. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.
- j. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacture equipped with HEPA filtered local exhaust ventilation.
- k. Prior to being plasticized, the Work Areas shall be cleaned using HEPA-vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used.
- l. There shall be an airlock at the entrance to the tent, unless there is an attached worker or waste decontamination system.
- m. Plasticize the area after pre-cleaning, using the following procedures. Do not apply polyethylene sheeting to the wall and ceiling surfaces that will be demolished to access ACM.
  - (1) Cover floor with one layer of fire retardant 6-mil polyethylene

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- sheeting, turning layer a minimum of 12 inches up wall, and seal layer to wall.
- (2) Cover walls with one layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to floor layer.
  - (3) Cover ceilings with one layer of fire retardant 6-mil polyethylene sheeting, overlapping wall layer a minimum of 12 inches, and seal layer to wall layer.
  - (4) Repeat procedure for second layer. All joints in polyethylene sheeting shall be glued and taped in such a manner as to prohibit air passage. Joints on plastic layers shall be staggered to reduce the potential for water to penetrate.
  - (5) In areas where demolition is required to access ACM, a layer of fire retardant 6-mil reinforced polyethylene sheeting shall be placed on the floor of the enclosure.
  - (6) Perform demolition required to access ACM. Debris resulting from demolition activities shall be disposed of as ACM as described in this Specification.
  - (7) Repeat preparation of areas accessed by demolition activities as described above.
  - (8) Suspended ceiling tiles and T-grid components shall remain in place until the preparation of the Work Area below the ceiling tiles are completed and personnel and equipment decontamination enclosures have been constructed.
  - (9) Protect non-ACM insulation within the Work Area(s) with two individual layers of fire retardant 6-mil polyethylene sheeting. Sheeting shall remain in-place until satisfactory clearance air monitoring results are achieved.
- n. Installation of glove-bags for removal of thermal system insulation, when required:
- (1) General: Glove-bag operations shall be performed using commercially available glove-bags of at least fire retardant 6-mil, transparent plastic appropriately sized for the diameter of the material to be removed. The use of "moveable" glove-bag techniques is strictly forbidden. At no time, shall the glove-bag be sized to allow for the removal of more than three linear feet of insulation. Glovebag procedures may only be used in

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conjunction with full containment of the work area or the tent procedure.

- (2) Place the necessary tools and materials inside of the tool pouch of the glove-bag before the glove-bag procedure begins.
  - (3) Place duct-tape securely around the affected area to form a smooth area to which the glove-bag can be securely fastened.
  - (4) Attach glove-bag to the cable, wire or pipe. Seal top of glove-bag by double folding and stapling. Place duct-tape along the seam to form an airtight seal. Seal sides of glove-bag, where cable, wire or pipe passes through, with duct-tape to form an airtight seal.
  - (5) If the material adjacent to the work section is damaged, terminates, is jointed or contains an irregularity, wrap the section in two layers of 6-mil fire retardant polyethylene sheeting and seal airtight with duct-tape.
  - (6) Smoke test each glove-bag as indicated below. The Third-Party Air Monitor shall be present during all smoke testing.
  - (7) The glovebag shall be placed under negative pressure utilizing a HEPA vacuum, and a smoke tube shall then be aspirated to direct smoke at all seams and seals from outside the glovebag. Any leaks detected by the smoke test shall be duct taped airtight.
  - (8) All necessary tools and materials shall be brought into the work area before the glovebag procedure begins.
  - (9) Glovebag procedures shall be conducted by workers specifically trained in glovebag procedures and equipped with appropriate personal protective equipment.
  - (10) The insulation diameter worked shall not exceed one half the bag working length above the attached gloves.
- o. Glovebag procedures shall be conducted by workers specifically trained in glovebag procedures and equipped with appropriate personal protective equipment.
- p. Pre-Removal Inspections
- (1) Prior to removal of any ACM, the Contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection.

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Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.

- (2) Contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.
- (3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

### 2. Removal of ACM Thermal Insulation Using Glove-Bag Techniques:

- a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.
- b. Remove the insulation using hand tools such as knives or scissors.
- c. Exercise caution when removing insulation.
- d. Remove any residual asbestos-containing insulation from the substrate using wet cleaning methods and nylon-bristled hand brushes.
  - (1) Any insulation ends created by this procedure shall be sealed with encapsulant prior to bag removal or thoroughly wetted before bag removal and sealed with wettable cloth end caps and spray glue or any combination of these materials immediately following bag removal.
  - (2) The tool pouch shall be separated from the bag prior to disposal by twisting it and the wall to which it is attached several times, and taping the twist to hold it in place, thus sealing the bag and the pouch which are severed at the midpoint of the twist. Alternatively, the tools can be pulled through with one or both glove inserts, thus turning the gloves inside out. The glove(s) is/are then twist sealed forming a new pouch, taped and several mid-seal forming two separate bags.
  - (3) A HEPA vacuum shall be used for evacuation of the glovebag in preparation for removal of the bag from the surface for clean-up in the event of a spill, and for post project clean-up.
  - (4) With the glovebag collapsed and the ACM in the bottom of the bag, the bag shall be twisted several times and taped to seal that section during bag removal.
  - (5) A 6-mil plastic bag shall be slipped around the glovebag while

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it is still attached to the surface. The bag shall be detached from the surface by removing the tape or cutting the top with blunt scissors.

- (6) The asbestos-containing waste, the clean-up materials, and protective clothing shall be wetted sufficiently, double-bagged minimizing air content, sealed separately, and disposed of in conformance with applicable regulations.
3. Removal of ACM Utilizing Tent Containment Procedure:
    - a. Tent procedures shall be limited to the removal of less than 260 linear feet and 160 square feet of ACM and shall not result in disturbance of ACM during tent erection.
    - b. Mist material with amended water and/or foam. Allow sufficient time for the amended water to penetrate the material to be removed.
    - c. Cut bands, wire or other items placed over insulation or ACM.
    - d. Remove the ACM using hand tools such as knives or scrapers.
    - e. Exercise caution when removing ACM.
    - f. Remove any residual asbestos-containing material from the substrate using wet cleaning methods.
    - g. Seal exposed ends of remaining insulation or ACM with a "wetable cloth" and/or encapsulant.
    - h. Place the removed material immediately into a properly labeled fire retardant 6-mil polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.
    - i. Following the completion of removal of ACM, all visible residue shall be removed from the substrate.
  4. Following Removal of ACM Utilizing Tent Containment or Tent/Glovebag Procedure:
    - a. Clean all visible accumulations of loose ACM. Metal shovels shall not be used within the Work Area.
    - b. Accumulations of dust shall be cleaned continuously until completion of clean up.

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- c. After removal of all visible accumulations of ACM, the area shall be:
- (1) Wet cleaned using rags, mops or sponges.
  - (2) Permitted sufficient time to dry, prior to HEPA vacuuming all substrates.
  - (3) Lightly encapsulated to lockdown residual asbestos. A thin coat of an encapsulating agent shall be applied to any surfaces in the Work Area which were not the subject of removal or other remediation activities. In no event shall encapsulant be applied to any surface that was the subject of removal or other remediation activities prior to obtaining satisfactory clearance air monitoring results. Contractor shall request and pass a visual inspection performed by the consultant before proceeding to the next step. Documentation of passing this inspection shall be recorded in a daily logbook.
  - (4) The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.
  - (5) If the Work is accepted by the Third-Party Air Monitor based on the inspection, Contractor shall be notified. Conduct the following activities in accordance with the contract and all applicable laws, codes, rules and regulations.
    - (a) All waste shall be removed from the Work Area and holding areas.
    - (b) All tools and equipment are to be removed and decontaminated in the decontamination enclosure system.
  - (6) If the Work is not approved, the Third-Party Air Monitor will inform Contractor who will then HEPA-vacuum and/or wet-clean the Work Area. The Third-Party Air Monitor will then perform a subsequent visual observation. This process will continue until the Third-Party Air Monitor accepts the Work Area as clean.
  - (7) The Work Area shall be vacated for a minimum of one hour to allow fibers to settle prior to clearance air monitoring, when required.
- d. Final Barrier Removal

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- (1) Upon receipt of acceptable clearance testing results polyethylene sheeting (inside layers) and Isolation Barriers shall be removed and disposed accordingly as ACM. The tent shall be collapsed inward, enclosing the contaminated clothing. This contaminated material shall be disposed of in another plastic bag. The HEPA vacuum shall be decontaminated and sealed.
  - (2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA-vacuum and wet methods.
- e. The Third-Party Air Monitor will conduct a final visual inspection. Approval must be granted prior to break down of decontamination facility and contractor demobilization. Other Information: Extra time required to clean Work Areas in order to achieve clearance criteria shall not be considered grounds for an extension of time for contract completion.
- D. Removal of Floor Tile and Mastic utilizing NYCDEP Title 15, Chapter 1 §1-108 Foam/Viscous Liquid Use in Flooring Removal procedures shall be as follows:
1. Preparation of the Work Area:
    - a. These procedures only apply to the removal of vinyl asbestos floor tiles (VAT), ACM floor coverings and associated mastics and adhesives, where only the ACM being abated in the work area is flooring material.
    - b. Request that the Third-Party Air Monitor perform area monitoring and establish a background count prior to the preparatory operations for each removal area.
    - c. Provide and install decontamination enclosure systems in accordance with PART 3 - EXECUTION, Sections 3.01 and 3.02 of these Specifications and NYCDEP Title 15, Chapter 1. Decontamination facilities may be remote from the Work Areas upon approval from NYCDEP.
    - d. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC components shall be sealed with tape and two layers of polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos contaminated waste.
    - e. Shut down, disconnect, and lock out or tag all electric power to the

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Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.

- f. Seal floor drains, sumps and other collection devices with two layers of fire retardant 6-mil plastic and fire rated plywood, as necessary, and provide a system to collect all water used by the Contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.
- g. Separate by means of airtight barriers (isolation barriers) parts of the building that are not included in the Work Area(s) from parts of the building that will undergo asbestos abatement.
- h. Seal with isolation barriers: open doorways, cased openings, and corridors that will not be used for passage during work.
- i. Isolation barriers shall extend from the floor to the ceiling and form an airtight seal. They shall be built using 2-inch by 4-inch wood or metal framing placed 16 inch on center and shall be braced as necessary. Cover the work sides of the studding with two layers of 6-mil fire retardant, reinforced polyethylene sheeting. Install barriers to form a leaktight seal between the Work Area and adjacent areas. Install isolation barriers in a manner to endure "negative air pressure" within the Work Area.
- j. Completely seal airtight and isolate the Work Area. All openings, including but not limited to doorways, tunnels, ducts, grilles, cracks, diffusers, openings through which pipe conduit passes, and any other penetrations of the Work Area, shall be covered with polyethylene sheeting taped or caulked airtight.
- k. Maintain emergency and fire exits from the Work Areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with fluorescent paint or other effective designations to permit easy location from anywhere within the Work Area. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.
- l. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.
- m. After isolating the area, install and initiate operation of air filtration devices (AFDs) to provide a negative pressure of at least -0.02 inches of water and four air changes per hour within the Work Area relative

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to surrounding non-Work Areas. In areas where negative air units can not be exhausted to the exterior of the station, units shall be installed in series. When installing units in series, the exhaust from an AFD shall be exhausted into the intake of a second AFD of equal or greater capacity. The exhaust from the second unit shall be directed to the exterior of the Work Area in an area that is not accessible to the public. Both units shall be located inside the Work Area. Exhaust and connect AFD using spiral-reinforced tubing manufactured for this purpose. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures.

- n. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation.
- o. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid Work Area surface.
- p. Work Area Pre-cleaning Procedures: After establishing the decontamination enclosure systems, prepare and pre-clean the Work Area as specified below:
  - (1) Movable and loose items not removed by the City shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate and shall be removed from the Work Area and stored at the City's direction.
  - (2) Movable and loose items contaminated with asbestos shall be removed from the Work Areas and properly discarded as asbestos contaminated waste.
  - (3) Fixed objects within the Work Area shall be pre-cleaned using HEPA-vacuum equipment and/or wet cleaning methods as appropriate. Joints of covers or casings shall be sealed with tape and fixed objects enclosed with a minimum of two layers of 6-mil fire retardant polyethylene sheeting sealed airtight with tape. Disassembly of these fixed objects is not required unless otherwise noted. Fixed objects shall include, but not be limited to, light fixtures, junction boxes, hangers and black carrying channels.
  - (4) Prior to being plasticized, the Work Areas shall be cleaned using HEPA-vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA-filters, shall not be used.

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- q. Plasticize the area after pre-cleaning, using the following procedure:
  - (1) Floor surfaces shall be sealed with a minimum of two layers of fire retardant 6-mil plastic sheeting, except where the only ACM being abated in the project is vinyl asbestos floor tile or other flooring material, in which case the floor need not be sealed;
  - (2) Baseboards and wall surfaces shall be sealed with a minimum of two layers of fire retardant 6-mil plastic sheeting up to a minimum height of four feet above the floor. If hand power tools are used during abatement, wall surfaces shall be covered with a layer of fire retardant 6-mil polyethylene sheeting to minimum height of six feet.
  
- r. Pre-Removal Inspections
  - (1) Prior to removal of any ACM, the Contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.
  - (2) Contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.
  - (3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.

### 2. Removal of ACM Floor Tile and Mastic:

- a. Prior to actual removal, the floor tiles and associated mastic shall be blanketed and wetted with a minimum 1-inch to 3-inch coating of the acceptable foam or viscous liquid that shall leave an identifiable colored residue when it dissipates and shall be maintained for the duration of the removal until the material is bagged.
- b. The foam or viscous liquid shall be non-toxic, shall not require special respiratory protection from handling, and shall not affect the handling and disposal of the waste.
- c. The foam or viscous liquid shall coat and wet the ACM. The ACM shall be kept wet through the bagging process.
- d. Persons entering the work area shall wear correctly-fitting, good-traction rubber boots.

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- e. Remove floor tile and all underlying layers using a flat hoe or scraper. Remove adhesive backing using approved mastic removal solvent. Do not grind or sand floor.
  - f. Completely remove floor tile and adhesive backing using appropriate tools and materials. As material is removed, wrap it in two layers of plastic and place it in labeled containers for transport.
  - g. Completely remove bulk mastic using an approved mastic solvent. Product application shall be in accordance with the manufacturer's instructions and the Material Safety Data Sheet (MSDS) for the product. Do not allow solvent to stand or to be absorbed by sub-floor. Use diatomaceous earth to prevent the flow of solvent under walls or into other areas from which it would be difficult to recover. Absorb spent solvent and associated mastic immediately after use with diatomaceous earth and place in drums dedicated for the disposal of floor tile mastic waste.
  - h. After completion of mastic removal, thoroughly wash the floor with detergent and rinse clean. Use sufficient quantities of diatomaceous earth to soak up water and detergent so that the waste is completely solid. Place waste in sealed drums dedicated for the disposal of floor tile mastic waste. No bulk mastic residue and traces of foam/viscous liquid shall remain on the floor surface following removal and cleaning. It is not necessary to remove stain from pores of concrete.
  - i. Spent mastic removal agents must be properly stored, categorized and disposed. Refer to "ACM Waste Packing and Load Out Procedures".
  - j. On completion of floor mastic removal, the floor shall be smooth, free from ridges and bumps, and suitable to receive replacement flooring.
3. Additional Removal Requirements: The Third-Party Air Monitor shall issue a stop work order if visible emissions are detected outside the Work Areas and/or should the airborne fiber concentrations meet or exceed 0.01 f/cc of air or the background count (use the greater of these two values as the reference). Work shall not resume until the condition(s) causing the increase are corrected, surfaces are decontaminated using HEPA vacuums or wet cleaning techniques and the Contractor receives notice from the Third-Party Air Monitor.
4. Following Removal of ACM Floor Tile and Mastic:
- a. All surfaces shall be wet cleaned.

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- b. HEPA-vacuum all surfaces.
- c. Conduct the following activities in accordance with the contract and all applicable laws, codes, rules and regulations.
  - (1) All waste shall be removed from the Work Area and holding areas.
  - (2) All tools and equipment are to be removed and decontaminated in the decontamination enclosure system.
- d. The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.
- e. If the Work is not approved, the Third-Party Air Monitor will inform Contractor who will then wet-clean and HEPA-vacuum the Work Area. The Third-Party Air Monitor will then perform a subsequent visual observation. This process will continue until the Third-Party Air Monitor accepts the Work Area as clean.
- f. Remove polyethylene barriers from the walls of the Work Area. Isolation barriers shall remain in place.
- g. Perform a thorough HEPA-vacuuming of the Work Area.
- h. The Third-Party Air Monitor will conduct a visual observation of the Work Area to verify the absence of asbestos-containing waste materials.
- i. If the Work is not approved, the Third-Party Air Monitor will inform Contractor who will then HEPA-vacuum the Work Area. The Third-Party Air Monitor will then perform a subsequent visual observation. This process will continue until the Third-Party Air Monitor accepts the Work Area as clean.
- j. If results of air sampling performed during abatement activities indicate airborne fiber concentrations of less than 0.01 fibers per cubic centimeter, or the background level, whichever is greater, final clearance air sampling is not required. The abatement action may be considered complete.
- k. Isolation Barrier Removal
  - (1) Upon receipt of acceptable observation results, polyethylene sheeting and barrier tape shall be removed and disposed accordingly as ACM.

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- (2) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.
  1. The Third-Party Air Monitor will conduct final visual inspection. Approval must be granted prior to break down of decontamination facility and contractor demobilization. Other Information: Extra time required to clean Work Areas in order to achieve clearance criteria shall not be considered grounds for an extension of time for contract completion.
- E. Removal of ACM Vinyl Asbestos Floor Tiles (VAT) and other Asbestos Containing Materials by Full containment Procedures without Plastic on the Floor utilizing NYC DEP Variance Attachment VA shall be as follows:
1. Preparation of the Work Area:
    - a. Request that the Third-Party Air Monitor perform area monitoring and establish a background count prior to the preparatory operations for each removal area.
    - b. Provide and install decontamination enclosure systems in accordance with PART 3 - EXECUTION, Sections 3.01 and 3.02 of these Specifications and the NYCDEP Variance.
    - c. Shut down, isolate, and lock out or tag heating, ventilating, and air conditioning (HVAC) systems which serve or which pass through the Work Area. Vents within the Work Area and seams in HVAC components shall be sealed with tape and two layers of polyethylene sheeting. Filters in HVAC systems shall be removed and treated as asbestos contaminated waste.
    - d. Shut down, disconnect, and lock out or tag all electric power to the Work Area so that there is no possibility of its reactivation until after clearance testing of the Work Area.
    - e. Seal floor drains, sumps and other collection devices with two layers of 6-mil fire retardant plastic and fire rated plywood, as necessary, and provide a system to collect all water used by the Contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.
    - f. The foam or viscous liquid shall be non-toxic, shall not require special respiratory protection for handling, and shall not affect the handling and disposal of the waste.
    - g. The foam or viscous liquid shall coat and maintain a stable blanket

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(minimum 1" thickness) for the duration of the removal process and shall leave an identifiable colored residue when it dissipates. The acceptable foam or viscous liquid shall be maintained for the duration of the removal until the material is bagged.

- h. The foam or viscous liquid shall coat and wet the ACM. The ACM shall be kept wet through the bagging process.
- i. Baseboards and wall surfaces up to a minimum height of four feet above the floor shall be covered with a layer of fire retardant 6-mil plastic sheeting. If hand power tools are used during the abatement, wall surfaces shall be covered with a layer of fire retardant 6-mil polyethylene sheeting to a minimum height of six feet.
- j. Negative air pressure ventilation shall be provided to allow make-up air into the work area, and the air outlet from the work area shall be at or near the floor level.
- k. Separate by means of airtight barriers (isolation barriers) parts of the building that are not included in the Work Area(s) from parts of the building that will undergo asbestos abatement.
- l. Seal with isolation barriers: open doorways, cased openings, and corridors that will not be used for passage during work.
- m. Isolation barriers shall extend from the floor to the ceiling and form an airtight seal. They shall be built using 2-inch by 4-inch wood or metal framing placed 16 inch on center and shall be braced as necessary. Cover the work sides of the studding with two layers of 6-mil reinforced, fire retardant polyethylene sheeting. Do not cover wall surfaces or track boxes that will be affected by abatement activities. Install barriers to form a leaktight seal between the Work Area and adjacent areas. Install isolation barriers in a manner to endure "negative air pressure" within the Work Area.
- n. Completely seal airtight and isolate the Work Area. All openings, including but not limited to doorways, tunnels, ducts, grilles, cracks, diffusers, openings through which pipe conduit passes, and any other penetrations of the Work Area, shall be covered with polyethylene sheeting taped or caulked airtight.
- o. Maintain emergency and fire exits from the Work Areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with fluorescent paint or other effective designations to permit easy location from anywhere within the Work Area. Emergency exits shall be secured to prevent access from uncontaminated areas and yet

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permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

- p. Temporary lighting within the Work Area and decontamination system shall be provided as required to achieve minimum illumination levels.
- q. After isolating the area install and initiate operation of air filtration devices (AFDs) to provide a negative pressure of at least -0.02 inches of water and six air changes per hour within the Work Area relative to surrounding non-Work Areas. In areas where negative air units cannot be exhausted to the exterior of the station, units shall be installed in series. When installing units in series, the exhaust from an AFD shall be exhausted into the intake of a second AFD of equal or greater capacity. The exhaust from the second unit shall be directed to the exterior of the Work Area in an area that is not accessible to the public. Both units shall be located inside the Work Area. Exhaust and connect AFD using spiral-reinforced tubing manufactured for this purpose. Do not shut down AFDs until the Work Area is released to the City following final clearance procedures.
- r. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be manufacturer-equipped with HEPA filtered local exhaust ventilation.
- s. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid Work Area surface.
- t. Work Area Pre-cleaning Procedures: After establishing the decontamination enclosure systems, prepare and pre-clean the Work Area as specified below:
  - (1) Movable and loose items not removed by the City shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate and shall be removed from the Work Area and stored at the City's direction.
  - (2) Movable and loose items contaminated with asbestos shall be removed from the Work Areas and properly discarded as asbestos-asbestos contaminated waste.
  - (3) Fixed objects within the Work Area shall be pre-cleaned using HEPA-vacuum equipment and/or wet cleaning methods as appropriate. Joints of covers or casings shall be sealed with tape and fixed objects enclosed with a minimum of two layers of 6-mil fire retardant polyethylene sheeting sealed airtight

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with tape. Fixed objects shall include, but not be limited to, light fixtures, junction boxes, hangers and black carrying channels.

- (4) Prior to being plasticized, the Work Areas shall be cleaned using HEPA-vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA-filters, shall not be used.
- u. Plasticize the area after pre-cleaning, using the following procedure:
- (1) Cover walls with one layer of 6-mil fire retardant polyethylene sheeting, and seal to floor.
  - (2) Cover walls with a second layer of 6-mil fire retardant polyethylene sheeting, overlapping first wall layer a minimum of 12 inches, and seal to floor.
- v. Pre-Removal Inspections
- (1) Prior to removal of any ACM, the Contractor shall notify the Third-Party Air Monitor and request a pre-removal inspection. Posting of warning signs, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Third-Party Air Monitor.
  - (2) Contractor shall correct any deficiencies observed by Third-Party Air Monitor at no additional cost to City.
  - (3) Following the Third-Party Air Monitor's approval of the Work Area preparations, removal of ACM may commence.
2. Removal of ACM Within Full Containment:
- a. Mist material with amended water. Allow sufficient time for the amended water to penetrate the material to be removed.
  - b. Remove the material using hand tools such as scrapers or putty knives. Wire-mesh or wood lathe reinforcing, when present, shall be cut into manageable pieces and disposed of as ACM.
  - c. Remove any residual material from the substrate using wet cleaning methods and nylon-bristled hand brushes.

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- d. Place the removal material immediately into a properly labeled 6-mil fire retardant polyethylene bag. All material shall be properly containerized and decontaminated prior to removal from the Work Area.
  - e. Following the completion of removal of insulation, all visible residue shall be removed from the substrate
3. Following Removal of ACM utilizing Full Containment Procedures:
- a. First Cleaning:
    - (1) Clean-up procedures shall involve removal and bagging of the ACM, of visible accumulations of asbestos containing waste, and of all traces of foam or similar viscous liquid. Following the removal of all debris, the work area shall be thoroughly wet cleaned and HEPA vacuumed.
    - (2) Upon request of the Contractor, the Third-Party Air Monitor will perform a visual inspection. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.
    - (3) Remove first layer of plastic sheathing inside the Work Area. The isolation barriers and decontamination facility shall remain in place and be utilized.
  - b. Second Cleaning:
    - (1) After the first cleaning, the Work Area shall be vacated for twelve hours to allow fibers to settle.
    - (2) All objects and surfaces in the Work Area shall be HEPA - vacuumed and wet cleaned for a second cleaning.
    - (3) A thin coat of lockdown encapsulant shall be applied to all plastic covered surfaces in the Work Area.
    - (4) When the encapsulant is dry, second layer of polyethylene sheeting on the walls and ceiling shall be removed. Do not remove seals from doors, windows, Isolation Barriers or disconnect the negative pressure equipment.
  - c. Third Cleaning:
    - (1) A minimum of four hours after the second cleaning, all the surfaces in the Work Area shall be HEPA-vacuumed and wet cleaned for a third cleaning.

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- (2) Upon the request of the Contractor, the Third-Party Air Monitor for observing whether cleaned areas are free of dust, dirt, and debris will do final visual inspection for re-occupancy. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.
- (3) When the Work Area passes the Third-Party Air Monitor's visual re-occupancy inspection, air sampling shall not begin until at least one hour after the completion of the third cleaning. The Third-Party Air Monitor shall perform air monitoring using aggressive testing techniques. The Third-Party Air Monitor will approve re-occupancy if the specified fiber count in the Work Area is achieved according to the Third-Party Air Monitor.
- (4) When the Work Area passes the re-occupancy test, all controls and seals established shall be removed.

d. Final Barrier Removal:

- (1) The work area shall be allowed to dry completely before the visual inspection is conducted. The project monitor and asbestos handler supervisor shall confirm the absence in the work area of ACM, asbestos-containing waste or debris, and foam or other viscous liquid.
- (2) Upon successful visual inspection and acceptable clearance testing results, plastic sheeting shall be removed from baseboards and wall surfaces. Isolation barriers shall remain in place.
- (3) The area surrounding the abatement work place shall be cleaned of any visible debris utilizing HEPA vacuum and wet methods.

- e. The Third-Party Air Monitor will conduct a final visual observation. Approval must be granted prior to break down of decontamination facility and contractor demobilization.

### 4.02 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS

- A. Ensure that barriers are installed in a manner appropriate to the expected weather conditions during the project and for its duration. Repair damaged barriers and remedy defects immediately upon their discovery. Visually inspect barriers at the

beginning and end of each work period.

- B. Visually inspect non-Work Areas and the decontamination enclosure system for water leakage. Check the floor below, ceiling and walls, and view beneath/or around the decontamination enclosure system, for signs of leakage. Perform the visual inspection a minimum of two times for each 8-hour work shift.

**PART 5 – ASBESTOS WASTE MANAGEMENT**

**5.01 ACM WASTE REQUIREMENTS**

- A. The Contractor and all sub-Contractors are specifically alerted to the illegal practice of combining asbestos-containing waste (ACW) from one project with the ACW of other projects without using the services of a permitted waste transfer station as defined by 6 NYCRR Part 360 and 364. As part of the shop drawing submittals, the Contractor must submit for approval the proposed method of transportation and disposal that will be utilized to manage the ACW of this Contract. If a permitted transfer station is to be used, the cost shall be included in the Bid price. The Contractor must submit a waste manifest consistent with whatever approved method is utilized as part of the invoicing and payment procedures.
- B. The Contractor shall maintain compliance with the strictest set of regulations of Title 15, Chapter 1 of RCNY, NYC LL 70/85, NYS DOL ICR 56, USEPA, Asbestos Regulation 40 CFR Section 61.152, 29 CFR 1926.1101, 29 CFR 1910.1200 (F) of OSHA's Hazard Communication Standards, and other applicable standards.

**NOTE:** Any penalties incurred for failure to comply with any of the above regulations will be the sole responsibility for fines imposed due to negligence of the Contractor.

- C. When presenting ACW for storage at the generation site, the Contractor shall:
  - 1. Wet down ACW in a manner sufficient to prevent all visible emissions of dust into the air.
  - 2. Seal material in a leak tight container while wet.
  - 3. Keep ACW separate from any other waste.
- D. When presenting ACW for storage away from the site of generation, the Contractor shall:
  - 1. Ensure that ACW has been properly packaged as per requirements above.
  - 2. Examine the containers of ACW to ensure that there are no breaks in the

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containers and that no visible dust is being released into the air.

3. If examination reveals damage to a container of ACW the Contractor or person accepting the waste shall immediately wet down the ACW and repackage it into a clean leak tight container. The subsequent repackaging shall be the financial responsibility of the Contractor and occur at no extra cost to the City.
  4. Keep ACW separate from any other waste.
- E. When storing ACW – The Contractor shall:
1. Ensure that the ACW has been sufficiently wetted down in tight containers.
  2. Re-wet and repackage any damaged containers.
  3. Maintain at storage site an adequate supply of spare leak tight containers.
  4. Maintain at storage site an adequate supply of amended water.
  5. Keep ACW separate from any other waste.
  6. Keep ACW in a secured, enclosed, and locked container.
  7. If the Contractor has intention of sorting a quantity of ACW greater than or equal to 50 cubic yards, the Contractor shall:
    - a. Submit a written request and receive written approval from the City.
- F. When presenting for transport, the Contractor shall:
1. Ensure that ACW has been sufficiently wetted down.
  2. Examine the integrity of the container's airtight seal.
  3. Re-wet and repackage any damaged containers.
  4. Keep ACW separate from all other waste.

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5. Ensure that a person transporting asbestos waste holds a valid permit issued pursuant to law.
6. Frequency of Waste Removal:
  - a. Properly packaged and labeled asbestos waste shall be removed from the site on a daily basis. Under no circumstance shall asbestos waste be stored on site without written approval from the City. The Waste Hauler and landfill shall be as indicated on the notifications to regulatory agencies.
- G. Waste Load-out Through Equipment Decontamination Enclosure (Full Decontamination Facility): Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in one layer of 6-mil thick polyethylene sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA-vacuuming in a designated part of the Work Area. Move wrapped asbestos waste to the equipment washroom, wet clean each bag or object and place it inside a second disposal bag, or a second layer of 6-mil polyethylene sheeting, as the item's physical characteristics demand. Air volume shall be minimized, and the bags or sheeting shall be sealed airtight with tape.
  1. The clean containerized items shall be moved to the equipment decontamination enclosure holding area pending load-out to storage or disposal facilities.
  2. Workers who have entered the equipment decontamination enclosure system from the uncontaminated non-Work Area shall perform load-out of containers from the decontamination enclosure holding area. Dress workers moving asbestos waste to storage or disposal facilities in clean overalls of a color different than from that of coveralls used in the Work Area. Ensure that workers do not enter from uncontaminated areas into the equipment washroom or the Work Area. Ensure that contaminated workers do not exit the Work Area through the equipment decontamination enclosure system.
  3. Thoroughly clean the equipment decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.
  4. Labeled ACM waste containers or bags shall not be used for non-ACM debris or trash. Any materials placed in labeled containers or bags, including those turned "inside-out", shall be handled and disposed of as ACM waste.

## ASBESTOS ABATEMENT

- H. All asbestos materials, wastes, shower water, polyethylene, disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York Department of Environmental Conservation and New York City Department of Sanitation.
- I. All asbestos materials shall be prepared for transportation in accordance with this specification and all applicable Federal, State, County and City Regulations. Contractor shall submit the following documentation:
1. Where applicable, an EPA Generator's identification number which has been obtained from the EPA for all asbestos waste generated from the project.
  2. Applicable State Waste Hauler license and registration numbers.
  3. Federal Hazardous Materials Waste Hauler number.
  4. Designated landfill EPA Permit numbers.
- J. Prior to loading asbestos waste the enclosed cargo areas (dumpster) shall be prepared as follows:
1. Clean via HEPA-vacuum and wet wipe techniques the enclosed cargo areas of all visible debris prior to preparing with polyethylene.
  2. Line the cargo area with two layers of 6-mil polyethylene sheeting to prevent contamination from damaged or leaking containers. Floor sheeting shall be installed first and extend up the walls a minimum of 24-inches. Wall sheeting shall be overlapped and taped securely into place.
- K. Asbestos-containing waste shall be placed on level surfaces in the cargo area of the dumpster and shall be packed tightly to prevent any shifting or tipping of the waste during transportation.
- L. Asbestos-containing waste shall not be thrown into or dropped from the dumpster. All material shall be handled carefully to prevent rupture of the containers.
- M. All personnel engaged in handling and loading of asbestos contaminated waste outside of the Work Area shall wear protective clothing. The disposable clothing shall include head, body and foot protection and color of clothing shall be different from abatement personnel in the Work Area. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters.
- N. Contractor shall immediately clean debris or residue observed on containers or surfaces outside of the Work Area. Cleaning shall be via HEPA equipped wet/dry vacuums only.

## ASBESTOS ABATEMENT

- O. All asbestos-containing waste shall be transported from the abatement site to the landfill by a registered Waste Hauler. When transporting ACW:
  - 1. Ensure that the ACW has been sufficiently wetted down in a leak tight container.
  - 2. Re-wet and repackage any damaged containers.
  - 3. Maintain at storage site an adequate supply of spare leak tight containers.
  - 4. Maintain at storage site an adequate supply of amended water.
  - 5. Keep ACW separate from any other waste.
- P. Keep ACW in a secured, enclosed, and locked container.
- Q. Waste transport documents shall conform to the requirements of the U.S. Department of Transportation, Hazardous Materials Transportation Regulation, 49 CFR Part 173 and EPA 40 CFR 61.150 (d)(1)(2). Shipping documents shall be clearly marked with the required designation "RQ Asbestos". Contractor shall provide a copy of this document to the City.
- R. A uniform hazardous waste manifest shall be prepared by the Contractor and signed by the Contractor each time the Contractor ships a dumpster load of Asbestos-Containing Waste Material. The uniform hazardous waste manifest shall include the site of waste generation, the names and addresses of the Transporter, the Contractor, and the landfill operator with information on the type and number of asbestos-waste containers, time and date. Contractor shall provide the Construction Project Manager, Third-Party Air Monitor or authorized designated representative with signed copies of the waste manifest before each departure.
- S. Contractor or his registered hazardous Waste Hauler shall transport asbestos-containing waste material from the abatement site directly to the specified disposal site. Contractor or their Waste Hauler shall not accept material from any other site when transporting asbestos-containing waste material from the abatement site. The authorized DDC representative or Construction Project Manager reserves the right to travel with Contractor's Waste Hauler to the waste disposal site. No intermediate storage of waste material (i.e., Contractors warehouse) shall be permitted.
- T. Final or progress application for payments will not be processed unless all hazardous waste manifests generated to date have been received and reviewed by the Construction Project Manager.
- U. All asbestos materials, wastes, shower water, polyethylene disposable equipment and supplies shall be disposed of as asbestos contaminated waste, in accordance

## ASBESTOS ABATEMENT

with the EPA regulation (40 CFR, Section 61.150) and those requirements of the New York State Department of Environmental Conservation and the New York Department of Sanitation.

- V. Contractor shall transport all sealed drums to a landfill disposal site approved by the Department of Environmental Conservation and the EPA. Transportation shall be performed by a New York State registered Waste Hauler, where required. When presenting the ACW for disposal the Contractor or sub Contractor shall:
1. Ensure that waste container is properly labeled according to the National Emission Standard for Hazardous Air Pollutants (NESHAP); Asbestos Revision, 40 CFR, Part 61, Subpart M. The labels shall include the name of the waste generator and the location where the waste was generated.
  2. Comply with all applicable orders issued pursuant to asbestos disposal.
  3. Ensure that ACW has been sufficiently wetted down.
  4. Re-wet and repackage any damaged containers.
  5. Keep ACW separate from all other wastes.
- W. Contractor shall notify the waste disposal site, at least 24 hours prior to transportation of asbestos contaminated waste to be delivered. Contractor shall determine if a larger notification period is required.
- X. At the site Contractors or Waste Hauler trucks shall approach the dump location as close as possible for unloading asbestos waste. Containers shall be carefully placed in the ground. Do not throw containers from truck.
- Y. Contractor or Waste Hauler shall inspect containers as they are unloaded at the disposal site. Material in damaged containers shall be repacked in empty containers, as necessary.
- Z. Contractor or Waste Hauler shall not remove asbestos-containing waste Material from drums unless required to do so by the disposal site City. Used drums shall be disposed of as asbestos-asbestos contaminated waste.
- AA. All personnel engaged in unloading of the containers at the waste site shall wear protective clothing. The disposable clothing shall include head, body and foot protection. Minimum respiratory protection shall be half face, dual cartridge, air purifying respirators with HEPA-filters. Workers shall remove their protective clothing at the disposal site, place it in labeled disposal bags and leave them with the deposited waste shipment.

## ASBESTOS ABATEMENT

- BB. For the compaction operation, the Contractor shall ensure that disposal sites personnel have been provided with personal protective equipment by the disposal operator. If the disposal site City has not provided this protective equipment, the Contractor shall supply protective clothing and respiratory protection for the duration of this operation (PAPR respirators are mandatory).
- CC. If containers are broken or damaged, the Contractor or Waste Hauler shall, using personnel who are properly trained and wearing proper protective equipment, shall repackage the waste in properly labeled containers. Contractor shall then clean the entire truck and its contents using HEPA-vacuums and wet cleaning techniques until no visible residue is observed.
- DD. Following the removal of all containerized waste, the Contractor shall decontaminate the truck cargo area using HEPA-vacuums and/or wet cleaning techniques until no residue is observed. All 6-mil polyethylene sheeting shall be removed and discarded as asbestos-containing waste material along with contaminated cleaning material and protective clothing, in containers at the disposal site.
- EE. The transporter(s) of all asbestos waste shall not back-haul any items on his return from landfill/disposal site.
- FF. All asbestos waste shall be disposed of in an approved Asbestos Landfill site only.
1. NO PERSON UNDER ANY CIRCUMSTANCES SHALL ABANDON ACW. The same shall be disposed of only by certified persons in approved landfills.
  2. A manifest form will be signed by the Landfill documenting receipt and acceptance of the asbestos-containing waste. This manifest will be furnished to the City of New York within thirty calendar days from the project completion date.
  3. It is the responsibility of the Asbestos Contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The Asbestos Contractor must comply fully with these regulations and all appropriate U.S. Department of Transportation, EPA and other Federal, State and Local entities' regulations and all other current legal requirements.
  4. The Asbestos Contractor shall obtain an agreement from the transporter (s) that the practice of "Back-Hauling" will not be engaged in, with respect to any and all waste loads taken from this site during the work.

## ASBESTOS ABATEMENT

5. The Asbestos Contractor will document actual disposal of the waste at the designated landfill by having completed a Disposal Certificate and will provide a copy of the same to the Department of Design and Construction.

### PART 6 – ACCEPTANCE

#### 6.01 ACCEPTANCE

Upon satisfactory completion of all decontamination procedures, a certificate will be issued by the Construction Project Manager with copies to all parties.

- A. A letter of Compliance stating that all the work on the project was performed in accordance with the Specifications and all applicable Federal, State and Local regulations.
- B. All warranties as stated in the Specifications.

**END OF SECTION 028213**

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SECTION 03 30 00  
CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to the work of this Section.

1.2 SUMMARY

- A. Section includes but is not limited to the following as shown on the drawings and as specified herein:

1. Foundation systems including footings, walls, beams, pits and similar concrete.
2. Slabs on grade.
3. Structural slabs on metal deck.
4. Cast-in-place slabs and walls.
5. Stair pan fills.
6. Furnishing and installing all required anchors and inserts.
7. Placing in the forms all inserts, anchors, anchor bolts, bearing plates and the like furnished by other trades for casting into the concrete and cleaning of same after stripping of forms.
8. Protection of all inserts, anchors, hangers, sleeves and supports furnished and set by others for the attachment of other work to the concrete, or required to permit the passage of other work through the concrete.
9. Supply, fabricate and place all required reinforcing bars, mesh and other reinforcement for concrete where shown, called for, and/or required complete with proper supporting devices.
10. Erection and removal of all formwork required to properly complete the work.
11. Finishing of all concrete work as hereinafter specified.
12. Curing and protection of all concrete work.
13. Floor sealers and dust-proofing of all areas exposed and/or covered with carpet.
14. Cutting, patching, grouting, repairing and pointing up as required.
15. Vapor barrier system below slabs on grade.
16. Under slab drainage course.
17. Dewatering.
18. Waterproofing.
19. Grouting of all beam bearing plates and column base plates.
20. All other work and materials as may be reasonably inferred and needed to make the work of this section complete.
21. Waste Management

- B. Related Requirements:

1. Division 01 Section "Construction Waste Management and Disposal"
2. Division 04 Section "Unit Masonry"

3. Division 05 Section "Structural Steel"
4. Division 05 Section "Metal Deck"
5. Division 06 Section "Rough Carpentry"
6. Division 07 Section "Waterproofing"
7. Division 07 Section "Joint Sealants"

### 1.3 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including the following:
1. Reinforcement and forming accessories
  2. Admixtures
  3. Patching compounds
  4. Waterstops
  5. Joint systems
  6. Curing compounds
  7. Dry-shake finish materials
  8. Others items as requested by Commissioner.
- B. Shop Drawings; Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. The shop drawings shall be prepared only by competent detailers, checked by the contractor prior to submission.
1. The shop drawings shall show construction, contraction and isolation joint locations and the added reinforcement required at same.
  2. Obtain and coordinate information for sleeves and openings in concrete, which are required for the work of other trades. Make coordinated drawings showing size and location of openings and sleeves and incorporate this information on the reinforcing drawings.
  3. Only those splices indicated on the approved shop drawings will be permitted.
  4. Provide elevations of all foundation walls and other structural elements to a minimum 1/4" scale.
- C. Shop Drawings Formwork: Submit shop drawings for fabrication and erection of specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items which affect exposed concrete visually. Architect's review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility, prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.
- E. Contraction Joint Layout: Indicate proposed contraction joints required per applicable codes and drawings.
1. Location of contraction joints is subject to approval of the Architect.
- F. Samples: Submit samples of materials as requested by Architect, including names, sources and descriptions.
- G. Laboratory Test Reports: Submit laboratory test reports for concrete materials, mix design test and microwave test.
- H. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by the Commissioner. Manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements shall sign material certificates. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- I. Cold Weather and Hot Weather Concreting Procedures: Submit written descriptions of contractor's proposed cold weather and hot weather concreting procedures, when applicable.
- J. Certification that pozzolanic materials conforms to ASTM C 618-01 (noting class C or class F), ASTM C 989 or ASTM C1240.
- K. Certified recycled steel content. Provide cut sheets clearly indicating whether the rebar used meets the minimums for post-consumer OR post-industrial recycled contents. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and if the recycled content is post-consumer or post-industrial.
- L. Formwork: Specify whether reusable, permanent, salvaged or new wood forms are to be used.
- M. Recycled Aggregate: Provide laboratory reports indicating that aggregate conforms to ASTM C33 for structural concrete or ASTM D1241-00 for sub-base material. Provide cut sheets clearly indicating the source, total weight and volume of the recycled aggregate. If aggregate provided is a mix of virgin and recycled aggregates obtain a written affidavit from the manufacturer stating the recycled content percentage
- N. VOC content for curing compounds, sealants and release agents: Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each curing compound, sealant, hardener and release agent used highlighting VOC contents. VOC content must be less than or equal to limits stated under "PRODUCTS".

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- D. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. New York City Building Code, Latest Edition
  2. ACI 117 "Standard Specifications for Tolerances for Concrete Construction and Materials and Commentary."
  3. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and mass concrete."
  4. ACI 211.2, "Standard Practice for Selecting Proportions for Structural Lightweight Concrete."
  5. ACI 214R, "Evaluation of Strength Test Results of Concrete."
  6. ACI 232.2R, "Use of Fly Ash in Concrete."
  7. ACI 233R, "Guide to Use of Slag Cement in Concrete and Mortar."
  8. ACI 234, "Guide for the Use of Silica Fume in Concrete."
  9. ACI 301 "Specifications for Structural Concrete."
  10. ACI 302.1R "Guide for Concrete Floor and Slab Construction."
  11. ACI 304R, "Guide for Measuring, Mixing, Transporting and Placing Concrete."
  12. ACI 305R "Hot Weather Concreting."
  13. ACI 306.1-90 "Standard Specification for Cold Weather Concreting."
  14. ACI 308.1 "Standard Specification for Curing Concrete."
  15. ACI 309R, "Guide for Consolidation of Concrete."
  16. ACI 311.4R, "Guide for Concrete Inspections."
  17. ACI 315, "Details and Detailing of Concrete Reinforcement."
  18. ACI 318 "Building Code Requirements for Structural Concrete and Commentary."
  19. ACI 347 "Guide to Formwork of Concrete."
  20. Concrete Reinforcing Steel Institute, (CRSI) "Manual of Standard Practice."
  21. CRSI-WCRSI, "Placing Reinforcing Bars."
  22. AWS D1.4, "Structural Welding Code Reinforcing Steel."
  23. The ACI Field Reference Manual, SP-15 shall be kept at the job site, and the practices set forth therein shall be strictly adhered to.
  24. ASTM Standards as applicable in the building code of the local jurisdiction and as noted in this specification.
- E. Concrete Testing Service: The Contractor is responsible for the TR3 form for Concrete Mix Design. The following paragraph must be incorporated in the Mix Design article: Form TR3: Technical Report Concrete Mix Design: The Contractor shall be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Mix Design, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and

approval of concrete mix design, testing, signatures and professional seals, etc. compliant with NYC Department of Buildings requirements for each concrete mix design.

- F. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.
- G. Special Experience Requirements: The apparent low bidder shall demonstrate their experience as it relates to the NYPL Woodstock Branch Renovation project, and the Bidder and each major subcontractor shall have completed in a timely fashion a minimum of three (3) similar projects in scope and type within the past five (5) consecutive years. Each Contractor shall submit the names of three (3) projects that provide the most relevant experience for the project, in terms of scale, cost, quality, and type of construction and criticality of schedule. Include the project cost and the start and completion dates for each referenced project. Include client references for each project, including contact person and phone number. Failure to meet these qualification requirements may result in the disqualification of the bid. The references and qualification information shall be submitted within 2 weeks of the notice to the apparent low bidder. Failure to submit the qualifications within the time required may result in disqualification of the bid.
- H. Preconstruction Meeting:
  - 1. At least 35 days prior to the start of the concrete construction schedule, the Contractor shall conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction. The Contractor shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
  - 2. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
    - a. Contractor's superintendent
    - b. Laboratory responsible for the concrete design mix
    - c. Laboratory responsible for field quality control
    - d. Concrete subcontractor
    - e. Ready-mix concrete producer
    - f. Admixture manufacturer(s)
    - g. Concrete pumping equipment manufacturer.
  - 3. Minutes of the meeting shall be recorded, typed and printed by the contractor and distributed by him to all parties concerned within 5 days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Commissioner or Commissioner's representative, Architect, and Engineer of Record.
  - 4. The minutes shall include a statement by the concrete contractor indicating that the proposed mix design and placing can produce the concrete quality required by these specifications.
  - 5. A minimum of a 2 cubic yard trial mixture containing all required admixtures shall be placed at the job site using the accepted methods of placing, finishing and

curing. All applicable tests including slump, strength, air content, permeability, and air content will be performed. This shall occur at least four weeks before actual concreting operations with particular admixture begins. The admixture manufacturer(s) and inspectors shall be present. The same testing should be done in the laboratory at the same time for comparison. A test sample should be done for each condition that is to be placed.

6. The Engineer of Record will be present at the conference. The Contractor shall notify the Engineer of Record at least 10 days prior to the scheduled date of the conference.

## 1.5 DEFINITIONS

- A. Exposed to view: Situated so that it can be seen from eye level from a public location. A public location is that which is accessible to persons not responsible for operation or maintenance of the building.
- B. Lightweight concrete: Concrete intentionally made to have low density by use of lightweight aggregate conforming to ASTM C330 and required to have an air-dry unit weight less than 115 lb/ft<sup>3</sup>.
- C. Normal weight concrete: Concrete for which density is not a controlling attribute, made with aggregates of the types covered by ASTM C33 and usually having unit weights in the range of 135 to 160 lb/ft<sup>3</sup>.

## 1.6 DESIGN REQUIREMENTS

- A. Performance Characteristics:
  1. Interior slabs on grade: Normal weight concrete with a minimum compressive strength of 4000 psi, non-air entrained, and a maximum water to cement ratio of 0.45.
  2. Foundations, foundation walls: Normal weight concrete with a minimum compressive strength of 4000 psi, air entrained, and a maximum water to cement ratio of 0.45.
  3. Exterior slabs on grade (pavements, stairs, areaways, etc), exposed to the elements: Normal weight concrete with a minimum compressive strength of 4000 psi, air entrained, and a maximum water to cement ratio of 0.40.
  4. Interior slabs of superstructure: Lightweight concrete with a minimum compressive strength of 3000 psi, air-entrained.

## 1.7 PROJECT CONDITIONS

- A. The Contractor, before commencing work, shall examine all adjoining work on which this work is in any way dependent for proper installation and workmanship according to the

intent of this specification, and shall report to the Commissioner any condition which prevents this contractor from performing first class work.

- B. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
- C. Protect adjacent finish materials against spatter during concrete placement.
- D. Provide all barricades and safeguards at all pits, holes, shaft and stairway openings, etc., to prevent injury to workmen and others within and about the premises. Also provide all safeguards as required by the Building Code, OSHA, or any other departments having jurisdiction. Take full responsibility for all safety precautions and methods.
- E. Procedure of Work: The contractor shall keep himself constantly informed as to the progress of the work in the field, materials and men ready to start work immediately when conditions of preceding work are available or ready, wholly or in part, so as not to delay the progress of building work or to interfere with the progress of work of other contractors, and in any event he shall, within 24 hours after notice from the Commissioner, proceed with such work as directed to maintain the uninterrupted progress of the work.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.[ Avoid damaging coatings on steel reinforcement.]
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

#### 1.9 GUARANTEE

- A. Upon completion of all work to be performed under this contract and acceptance of the same by the Commissioner, the contractor shall execute and deliver in a form satisfactory to the Commissioner, a guarantee that all workmanship and materials used in the performance of the contract shall remain free from defects for a period of one year from the date of the final certificate of occupancy.

### PART 2 - PRODUCTS

#### 2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct of plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide

form material with sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.

1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better mill oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Preference shall go to salvaged or re-used Dimensional Lumber. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide VOC compliant commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces. Use biodegradable form release agent listed below or equivalent made from soy or rapeseed oil.
  1. "Bio-Release EF" Dayton Superior
  2. "Soy Form Away" Cure & Seal by Natural Soy Products
  3. "Bio-Form" Leahy-Wolf Company
  4. "Duogard II" W. R. Meadows, Inc.
  5. "Atlas Bio-Guard" Atlas Construction Supply, Inc.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Form Ties: Form ties and spreaders: prefabricated assemblies by Richmond; Superior, Dayton or approved equal. Wire ties shall not be used. Ties for foundation work shall be of snap design with removal cones and water seal washer.
  1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
  3. Furnish ties with integral water-barrier plates to walls indicated to receive damproofing or waterproofing.

## 2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60.
- B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric, Galvanized.
- C. Welded Deformed Steel Wire Fabric: ASTM A 497, Galvanized.
- D. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- E. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

1. For epoxy coated reinforcement provide plastic protected chairs and plastic ties. All imperfections in the epoxy coating are to be repaired prior to placement of concrete.
  - a. Use recycled plastic rebar supports (give preference to local supplier if available). Subject to compliance with requirements, provide one of the following:
    - 1) International Plastics Group
    - 2) Eclipse Plastic
2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2), at a spacing not to exceed 4'-0" on center in either direction.

### 2.3 CONCRETE MATERIALS

- A. Portland cement: ASTM C 150, Type I. Total percentage of Portland Cement is NOT to exceed 75% of the cementitious mix. Use one brand of cement throughout project, unless otherwise acceptable to the Commissioner.
  - a. Fly Ash: Cast-in-place concrete shall incorporate fly ash as a replacement for at least 25% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Engineer of Record. Fly Ash shall not be used in conjunction with Ground Granulated Blast Furnace Slag.
  - b. Ground Granulated Blast Furnace Slag (GGBF): Cast-in-place concrete shall incorporate GGBF as a replacement for at least 40% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Engineer of Record. GGBF shall not be used in conjunction with Fly Ash.
  - c. Pozzolans and Slags: These must be completely accounted for in the design mix. Mix design must meet minimum design requirements set in the contract documents. Additional admixtures may be required to meet early strength requirements and alternative cementitious material goals. If a "blended cement" is used which already contains a certain percentage of Pozzolans or Slags this content may offset or entirely satisfy the minimum percentage required.
    - 1) Coal Fly Ash: ASTM C 618 (Class C or Class F): ASTM C 618 (Note: Class F fly Ash will require higher amounts of air entraining admixtures than class C).
    - 2) Blast Furnace Slag: ASTM C 989
    - 3) Silica Fume: ASTM C 1240
    - 4) Rice Hull (or "husk") Ash: ASTM C 618 Blended hydraulic cement, as defined by ASTM C 595 or ASTM C 1157
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
  1. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the Commissioner.

2. Normal weight Fine Aggregate: washed, inert, natural or manufactured or combination thereof, sand conforming ASTM C33 gradation.
  3. Normal weight Coarse Aggregate: well graded crushed stone or washed gravel conforming to ASTM C33, sizes 57 for foundations and 67 for slabs and structure.
    - a. Recycled crushed concrete aggregate in concrete mixes is only to be used with approval of Engineer of Record. Recycled aggregate shall be used only as a substitute for coarse aggregate and must also be washed and well-graded, conforming to ASTM C33.
    - b. For sub-base, slabs on grade and non-structural applications and Recycled Aggregate Materials are NOT required to meet the ASTM C 33 standard. In addition to concrete rubble, glass, porcelain, and tire chips can be used as filler material. Any inert material conforming to ASTM D1241 is acceptable for the applications described in this paragraph.
- C. Lightweight Aggregates: Well-graded crushed expanded shale produced by rotary kiln method. Solite or equal, conforming to ASTM C330.
- D. Water: Free from oils, acids, alkali, organic matter and other deleterious material to conform to ASTM C94. ASTM C94 for gray water use in the production of ready mixed concrete per approval by the Engineer of Record.
- E. Air-Entraining Admixture: Any material proposed for use as an air-entraining admixture should be tested in conformance with ASTM C 260.
1. Liquid air-entrainment: Use only agents derived from salts of wood resins. Select from products listed below or approved equal conforming to ASTM C-260.
 

a. "Airmix"	Euclid Chemical
b. "Darex AEA"	W. R. Grace
c. "MB-VR"	Master Builders
- F. Water-Reducing Admixture: ASTM C 494.
1. Products: Subject to compliance with requirements, provide one of the following:
 

a. "Polyheed 997"	Master Builders
b. "Euclid MR"	Euclid Chemical
c. "WRDA 64"	W. R. Grace.
- G. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.
1. Products: Subject to compliance with requirements, provide one of the following:
 

a. "Eucon 37, 1037 or Plastol 5000"	Euclid Chemical Co.
b. "Rheobuild 1000"	Master Builders
c. "Glenium 7500"	Master Builders
d. "Daracem-100"	W. R. Grace

H. Water Reducing, Non-Corrosive Accelerating Admixture: The admixture shall conform to ASTM C 494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Accelerating admixtures are not to be used as antifreeze agents. Accelerating admixtures are permitted only upon review by Engineer of Record.

1. Products: Subject to compliance with requirements, provide the following:

- |    |                 |                     |
|----|-----------------|---------------------|
| a. | "Accelguard 80" | Euclid Chemical Co. |
| b. | "Daraset"       | W. R. Grace         |
| c. | "Pozzutec 20"   | Master Builders.    |

I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.05 percent chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following:

- |    |                     |                     |
|----|---------------------|---------------------|
| a. | "Eucon Retarder 75" | Euclid Chemical Co. |
| b. | "Pozzolith 100XR"   | Master Builders.    |
| c. | "Plastiment"        | Sika Chemical Co.   |
| d. | "Daratard"          | W.R. Grace.         |

J. Microsilica Admixture shall be dry densified or slurry formed. Microsilica shall come from the same source throughout the project. If a single source cannot be maintained, laboratory testing of each new source shall be required before acceptance by the Engineer of Record at no cost to the Commissioner.

1. Products: Subject to compliance with requirements, provide one of the following:

- |    |                |                      |
|----|----------------|----------------------|
| a. | "Emsac F 100"  | Elkem Chemical, Inc. |
| b. | "Eucon MSA"    | Euclid Chemical Co.  |
| c. | "Force 10,000" | W. R. Grace          |

K. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

L. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of admixtures will be required from the admixture manufacturer prior to mix design review by the Engineer of Record.

M. Contractor will be required to provide information demonstrating successful use in prior placement involving all admixtures.

## 2.4 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Greenstreak
    - b. Williams Products, Inc.
  2. Profile: Flat, dumbbell with center bulb. Flat, dumbbell without center bulb. Ribbed with center bulb. Ribbed without center bulb. As indicated.
  3. Dimensions: 4 inches by 3/16 inch thick. 6 inches by 3/8 inch thick. 9 inches by 3/8 inch thick; nontapered.
- B. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BoMetals, Inc.
    - b. Greenstreak
    - c. Paul Murphy Plastics Company
    - d. Vinylex Corp.
  2. Profile: Flat, dumbbell with center bulb. Flat, dumbbell without center bulb. Ribbed with center bulb. Ribbed without center bulb. As indicated.
  3. Dimensions: 4 inches by 3/16 inch thick (100 mm by 4.75 mm thick). 6 inches by 3/8 inch thick (150 mm by 10 mm thick). 9 inches by 3/8 inch thick (225 mm by 10 mm thick); nontapered.
- C. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP
    - b. CETCO; Volclay Waterstop-RX
    - c. Concrete Sealants Inc.; Conseal CS-231
    - d. Greenstreak; Swellstop
    - e. Henry Company, Sealants Division; Hydro-Flex
    - f. JP Specialties, Inc.; Earth Shield Type 20

## 2.5 GROUT

- A. Non-Shrink, Non-Metallic Grout: The non-shrink grout shall be a factory pre-mixed grout and shall conform to ASTM C1107, "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)." In addition, the grout manufacturer shall furnish test data

from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 4' x 4' base plate.

1. Products: Subject to compliance with requirements, provide one of the following:

- |    |                   |                     |
|----|-------------------|---------------------|
| a. | "Euco-NS"         | Euclid Chemical Co. |
| b. | "Five Star Grout" | U.S. Grout Corp.    |
| c. | "Masterflow 713"  | BASF                |

B. High Flow Grout: Where high fluidity and/or increased placing time is required, use high flow grout. The factory pre-mixed grout shall conform to ASTM C1107, "Standard Specification for Packages Dry, Hydraulic-Cement Grout (Non-shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 18" x 36" base plate.

1. Products: Subject to compliance with requirements, provide one of the following:

- |    |                             |                     |
|----|-----------------------------|---------------------|
| a. | "Euco Hi-Flow Grout"        | Euclid Chemical Co. |
| b. | "Masterflow 928"            | BASF                |
| c. | "Five Star Fluid Grout 100" | Five Star           |

## 2.6 RELATED MATERIALS

- A. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 1241, Size 57, with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 8 sieve.
- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 1241, Size 10, with 100 percent passing a 3/8 inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.
- C. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rustproof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials.
- D. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- E. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Products: Subject to compliance with requirements, provide one of the following:

- |    |                            |
|----|----------------------------|
| a. | Waterproof paper           |
| b. | Polyethylene film          |
| c. | Polyethylene-coated burlap |

F. Curing Compounds: The compound shall conform to ASTM C 309. Limit VOC content to 130 g/L. Use water-based curing compound. For surfaces receiving both a curing compound and additional flooring, verify that the curing compound and additional flooring are compatible.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. SealTight 1100 W.R. Meadows
- b. Kurez W VOX Euclid Chemical Co.
- c. Luster Seal WB STD Euclid Chemical Co.
- d. VOCOMP-25 W.R. Meadows

G. Sealers/Hardeners: For use on concrete surfaces that will remain exposed. Slabs that will receive additional flooring do not require sealing or hardening. Sealers and hardeners must conform to ASTM D1546, not yellow under ultra violet light after 500 hours of test in accordance with and have a maximum moisture loss of 0.039 grams per sq. cm. when applied at a coverage rate of 250 sq. ft. per gallon. Limit VOC content to 130 g/L. Use water- or vegetable-based product.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Kure-N-Harden BASF

H. For concrete floors subjected to heavy vehicular traffic use a Liquid Sealer/Densifier: The product must be a high performance, deeply penetrating concrete densifier conforming to ASTM C836; odorless, colorless, VOC - compliant, non-yellowing silicate based solution designed to harden, dustproof and protect and to resist black rubber tire marks on concrete surfaces. The compound must contain a minimum of 20% solids content of which 50% is silicate

I. Evaporation Retardant:

1. Products Subject to compliance with requirements, provide one of the following:

- a. "Eucobar" Euclid Chemical Co.
- b. "Confilm" BASF

J. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F 710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. Insure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive. Reactivity releases VOCs and /or other toxic fumes.

K. Crack Sealer: Elastomeric liquid crack sealer resistant to water, gasoline, oil and salts.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. "Plasti-seal" Euclid Chemical Co.

- L. Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound.
1. Products: Subject to compliance with requirements, provide the following:
    - a. "Flo-Top 90 or Super Flo-Top" Euclid Chemical Co.
    - b. "Ardex" Ardex Co.
    - c. "Underlayment 110" Master Builders
- M. Bonding Admixture: The compound shall be a latex, non-rewettable type.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Flex-Con" Euclid Chemical Co.
    - b. "Daraweld C" W.R. Grace
    - c. "SBR Latex" Euclid Chemical Co.
- N. High Strength Polymer Repair Mortar: For form and pouring or large horizontal repairs, provide the flowable on-part, high strength repair mortar.
1. Products: subject to compliance with requirements, provide the following:
    - a. "Eucocrete" The Euclid Chemical Co.
    - b. "Euco Speed MP" (Cold Weather) The Euclid Chemical Co.
    - c. "Emaco R" Master Builders.
- O. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- P. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
1. Type IV for bonding hardened concrete to hardened concrete, and Type V for bonding freshly mixed concrete to hardened concrete.
- Q. Reglets: Fabricate reglets of not less than 0.022 inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- R. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- S. Vapor Barrier: Provide vapor barrier which conforms to ASTM E 1745, Class A or B. The membrane shall have a water-vapor permeance rate no greater than 0.012 perms when tested in accordance with ASTM E 154, Section 7. The vapor barrier shall be placed over prepared base material where indicated below slabs on grade. Vapor barrier shall be no less than 10 mil thick in accordance with ACI 302.1R. Preferred vapor barriers will be manufactured from post-consumer recycled polymers.
1. Products: Subject to compliance with requirements, provide one of the following:

- |    |                                     |                           |      |
|----|-------------------------------------|---------------------------|------|
| a. | "Stego Wrap (15 mil) Vapor Barrier" | Stego Industries LLC      |      |
| b. | "Griffolyn Vaporguard"              | Reef Industries           |      |
| c. | "Premoulded<br>Plastmatic Core"     | Membrane<br>W.R. Meadows. | with |

T. Expansion Joint Filler: ASTM D 1751.

1. Products: Subject to compliance with requirements, provide one of the following:

- |    |   |                  |
|----|---|------------------|
| a. | "Homex 300"                               | Homasote Company |
| b. | "Standard Cork Expansion<br>Joint Filler" | A.P.S. Cork      |
| d. | "Fibre Expansion Joint"                   | W.R. Meadows     |

U. Water: Potable.

2.7 PROPORTIONING AND DESIGN OF MIXES

A. Preparation of Design Mixes

1. All mix designs shall be proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and prepared by a licensed testing laboratory approved by the Commissioner, but paid for by the contractor. Submit mix designs on each class of concrete for review.
2. If previously used mixes are submitted, all materials shall be from the same sources and with the same brand names as the previously utilized mix.
3. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve an average compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1400 psi when concrete strengths of 5000 or more are used.
4. The proposed mix designs shall be accompanied by complete standard deviation analysis or trial mixture test data.
5. The Contractor is responsible for the TR3 form for Concrete Mix Design. The following paragraph must be incorporated in the Mix Design article: Form TR3: Technical Report Concrete Mix Design: The Contractor shall be responsible for, and bear all costs associated with the filing and securing of approvals, if any, for Form TR3: Technical Report Concrete Mix Design, including, but not limited to, engaging the services of a New York City licensed Concrete Testing Lab for the review and approval of concrete mix design, testing, signatures and professional seals, etc. compliant with NYC Department of Buildings requirements for each concrete mix design.

B. Submit each proposed mix to the Commissioner, Architect and Structural Engineer for review at least 5 days prior to the pre-concrete conference. Do not begin concrete production until Architect and Engineer of Record has reviewed and approved mixes.

1. Submit Test reports for any pozzolans or slags indicating compliance with ASTM C 618 or ASTM C 989, respectively.

2. Provide cut sheets clearly indicating the percentages of pozzolans or slags used in the mix design as replacement for Portland cement. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the percentage.
  3. Test reports for recycled aggregate indicating compliance with ASTM C 33. Provide cut sheets clearly indicating the percentage of aggregates used that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
  4. Provide cut sheets clearly indicating the percentage of sub-base and filler aggregate materials that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
- C. Design mixes to provide concrete with strength as indicated on drawings and schedules.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Commissioner and as accepted by Architect and Engineer of Record. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect and Engineer of Record before using in work.
- E. Admixtures:
1. Use water-reducing admixture or high range water-reducing admixture (superplasticizer) in all concrete as required for placement and workability.
  2. Use non-corrosive, non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
  3. Use high-range water-reducing admixture in pumped concrete, architectural concrete, parking structure slabs, fiber concrete, concrete required to be watertight, concrete with ultimate strength of 5,000 psi or more, and concrete with water/cement ratios below 0.50.
  4. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2 percent within following limits:
    - a. Concrete structures and slabs exposed to freezing and thawing or deicer chemicals.
      - 1) 4.5 percent (moderate exposure); 5.5 percent (severe exposure) 1-1/2" max. aggregate 4.5 percent (moderate exposure); 6.0 percent (severe exposure) 1" max. aggregate.
      - 2) 5.0 percent (moderate exposure); 6.0 percent (severe exposure) 3/4" max. aggregate.
      - 3) 5.5 percent (moderate exposure); 7.0 percent (severe exposure) 1/2" max. aggregate.
    - b. Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air.
    - c. Interior concrete subjected to vehicular traffic: 3 percent maximum.

5. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- F. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
1. Concrete for precast slabs, precast beams, structural topping slab, caisson caps, caissons, poured in place slabs and grade beams, columns and walls, over water, on ground or exposed to weather: W/C 0.40.
  2. Concrete on metal deck:
    - a. With specified minimum compressive strength not greater than 5,000 psi: 0.40.
    - b. With specified minimum compressive strength not greater than 7,000 psi: 0.35.
  3. "Quick Dry" Concrete: 0.40.
  4. Subjected to freezing and thawing; W/C 0.50.
  5. Subjected to deicers/watertight: W/C 0.45.
  6. Reinforced concrete subjected to brackish water, salt spray or deicers; W/C 0.40.
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramp slabs and sloping surfaces: Not more than 3".
  2. Reinforced foundation systems, including mud slabs below hydrostatic slabs: Not less than 1" and not more than 3".
  3. Concrete containing HRWR admixture (superplasticizer): Not more than 9" unless otherwise approved by the Commissioner. The concrete shall arrive at the job site at a slump of 2" to 3" (3" to 4" for concrete receiving a "shake-on" hardener or lightweight concrete), be verified, then the high-range water-reducing admixture added to increase the slump to the approved level.
  4. Other Concrete: Not less than 1" or more than 4".
- H. Chloride Ion Level: Chloride ion content of aggregate shall be tested by the laboratory making the trial mixes. The total chloride ion content of the mix including all constituents shall not exceed the limitations set forth in Table 4.4.1 of ACI 318 for concrete subjected to deicers or exposed to chloride in service (0.15% chloride ions by weight of cement).

## 2.8 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
- B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- C. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce maximum mixing and delivery time from

1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce maximum mixing and delivery time to 60 minutes.

- D. No water shall be added after mixing to concrete containing HRWR (Superplasticizer). If loss of slump occurs, the concrete treated with HRWR may be redosed as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Engineer of Record and the manufacturer.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

### 3.2 INSPECTION

- A. Examine all work prepared by others to receive work of this section and report any defects affecting installation to the Contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by others.

### 3.3 CONCRETE

- A. Concrete shall develop the minimum compressive strengths shown on drawings at 28 days when sampled and tested in accordance with ASTM C 31 and C 39 with the maximum slump in accordance with the approved mix design.
- B. Concrete shall be in accordance with the requirements and specifications of "Building Code Requirements for Structural Concrete" as modified by the building code noted above.
- C. Fly Ash Concrete & Slag Concrete: Concrete mixes containing high volumes of fly ash or Slag have slower set times and may take up to 56 days to reach full strength. The Engineer of Record, agency responsible for concrete mix design, the architect and the concrete subcontractor must coordinate to ensure that the form stripping schedule is consistent with the ability of the structure to support itself and all imposed construction loads.

### 3.4 FORMS

- A. Design formwork to maximize its reusability, reduce resources devoted to formwork construction and minimize waste generated. Where appropriate choose alternative formwork systems (refer to sections listed above).
- B. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by

concrete structure. Construct formwork so concrete members and structures are of correct size, shapes, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347. Provide Class A tolerances for concrete exposed to view. Provide Class C tolerances for other concrete surfaces.

- C. Design formwork to be readily removable without impact, shocks or damage to cast-in-place concrete surfaces and adjacent materials.
- D. Construct forms to size shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, recesses, and the like, to prevent swelling and for easy removal.
- F. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

### 3.5 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.

- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
- D. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

### 3.6 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.
- D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions, using manufacturer's specified welding irons.
- E. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals and elsewhere as indicated.
  - 1. Joint filler and sealant materials are specified in the section for "Related Materials"
- F. Contraction (Control) Joints in Slabs-on-Ground: Maximum joint spacing shall be 36 times the slab thickness unless otherwise noted on the drawings. The dry cut saw shall be used immediately after final finishing and to a depth of 1-1/4". A conventional saw shall be used as soon as possible without dislodging aggregate and to a depth of 1/4 slab thickness.
  - 1. Joint sealant material is specified in the section for "Related Materials".

### 3.7 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting

drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.
- C. Embedded Plates at Foundation Walls: Install plate at top of forms so that exterior face of steel plate is level and plumb. Use construction documents for locations, sizes and elevations.

### 3.8 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. If form-release compound is required, coat contact surfaces of forms with a form-coating compound *before* reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, and amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

### 3.9 CONCRETE PLACEMENT

- A. Ready-mix concrete shall comply with the requirements of ASTM C 94 and ACI 304. All plant and transporting equipment shall comply with the concrete plant standards and truck mixer and agitator standards of the National Ready Mix Concrete Association.
- B. Cold weather mixing procedures shall be submitted to the Commissioner for approval.
- C. Notify Commissioner's Inspector at least 36 hours (1 1/2 regular working days) before each pour so that forms and reinforcing may be examined. Do not place concrete until inspection has been made or waived.
- D. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
  - 1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

- E. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Use internal vibrators penetrating both the top and preceding layers.
- G. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- H. Use and type of vibrators shall conform to ACI 309 "Recommended Practice for Consolidation of Concrete." Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- I. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- J. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- K. Slabs: Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedge, bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. See also "MONOLITHIC SLAB FINISHES" below.
- L. Maintain reinforcing in proper position during concrete placement operations.
- M. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
1. When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Use only a non-corrosive, non-chloride accelerator. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are NOT permitted.
  4. Care must be taken to store water-based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- N. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
  2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
  3. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

### 3.10 FINISH OF FORMED SURFACES

- A. Concrete mixes containing pozzolans or slags do not set at the same rate or with the same bleed water characteristic as plain Portland cement. Therefore attention must be directed to the proper procedures. Refer to ACI 232.2R and ACI 301.
- B. Rough Form Finish: For formed concrete surface not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- C. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed. Follow all requirements in ACI 301, Chapter 10 for smooth form finish. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction.

### 3.11 FLOOR FLATNESS/LEVELNESS TOLERANCES

- A. FF defines the maximum floor curvature allowed over 24 in. Computed on the basis of successive 12 in. (300 mm) elevation differentials, FF is commonly referred to as the "Flatness F-Number".
- B. FL defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 ft. (3.05 m) distance commonly referred to as the "Levelness F-Number".

- C. All floors shall be measured within 72 hours of being poured and in accordance with ASTM E 1155 "Standard Test Method for Determining Floor Flatness and Levelness Using the "F Number" System (Inch-Pound Units).
- D. All slabs shall achieve the specified overall tolerance. The minimum local tolerance (1/2 bay or as designated by the Commissioner) shall be 2/3 of the specified tolerances.
- E. All elevated slabs shall achieve the specified FL tolerance before the removal of the forms.
- F. All slabs on metal deck shall achieve the specified FF.

### 3.12 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to slabs at crawl spaces, unless otherwise noted.
- B. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Surface shall achieve an FF 20 - FL 17 tolerance.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system, unless otherwise noted.
- D. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance and with a surface leveled to an FF 25/ FL 20 tolerance (FL17 for elevated slabs). Grind smooth surface defects, which would telegraph through applied floor covering system.
- E. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, and slab surfaces which are to be covered with membrane or elastic waterproofing, or sand-bed terrazzo, and as otherwise indicated, apply single trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction
- F. Sealers, Hardeners and Liquid Densifiers: Apply a coat of the specified compound to all EXPOSED interior concrete floors where indicated on the drawings. This surface must be continuously moist cured by a method satisfactory to the Commissioner. Apply and mechanically scrub compound into the floor in strict accordance with the manufacturer's printed instructions.

### 3.13 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
  2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
  3. In order to avoid plastic or drying shrinkage cracks during warm, dry or windy weather, ACI 302 and ACI 308 shall be followed using wind breaks and sun shades when recommended. Evaporation retardant shall be as specified in Section 2.04.
  4. Care must be taken to store water based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.
- B. Curing Methods: Perform curing of concrete by moisture curing, moisture-retaining cover curing, curing and sealing compound, and by combinations thereof, as herein specified.
1. Provide moisture curing by following methods.
    - a. Keep concrete surface continuously wet by covering with water.
    - b. Continuous water-fog spray.
    - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
  2. Provide moisture-retaining cover curing as follows:
    - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  3. Provide curing and sealing compound to exposed interior slabs not receiving additional flooring. A clear curing and sealing compound shall be used on exterior slabs, sidewalks and curbs not receiving a penetrating sealer.
  4. Use the specified curing compound on surfaces to be covered with finish or coating material applied directly to concrete, such as liquid densifier/sealer, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials. Apply compound in accordance with manufacturer's direction.
- C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of the specified curing compound or a continuous moist curing method approved by the Commissioner.
- E. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. In addition, insure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive.
- F. Sealer and Dustproofer: Apply a second coat of the specified curing and sealing compound to exposed interior slabs not subjected to vehicular traffic, noted on the drawings. These slabs must have received an initial coat of the curing and sealing compound.

### 3.14 SHORES AND SUPPORTS

- A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.
- B. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.
- C. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

### 3.15 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 12 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

### 3.16 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are intended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

### 3.17 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in- place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Grout base plates and foundations as indicated using specified free-flowing non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.
- E. Where high fluidity and/or increased placing time is required use the specified high flow grout. This grout shall be used for all base plates larger than 10 square feet.
- F. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screeds, tamp, and finish concrete surfaces as scheduled.
- G. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

### 3.18 CONCRETE SURFACE REPAIRS

- A. Prior to all repairs, an as-built condition sketch and method of repair must be submitted to the Architect and Engineer of Record for review and approval.
- B. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
- C. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make

edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with a bonding grout containing the specified bonding admixture. Place patching mortar after while bonding grout is still tacky.

- D. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- E. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discoloration's that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or pre-cast cement cone plugs secured in place with bonding agent.
- F. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- G. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for tureens of slope, in addition to smoothness, using a template having required slope.
- H. Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- I. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days, except at hydrostatic slabs.
- J. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. The specified underlayment compound or repair topping may be used when acceptable to Architect.
- K. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
- L. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound.

Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

- M. Structural Repair: All structural repairs shall be made with prior approval of the Engineer of Record as to method and procedure, using the specified polymer repair mortar and/or specified epoxy adhesive. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously specified shall be used. In addition, all cracks shall be filled with the specified crack sealer or other method as approved by the Engineer of Record. All garage slabs shall be repaired prior to the slab being treated with the specified penetrating anti-spalling sealer.
- N. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material. Underlayment application shall achieve the tolerances specified in "MONOLITHIC SLAB FINISHES" above.
- O. Specified Polymer Horizontal Repair Mortar: All exposed floors shall be leveled, where required, with the specified self-leveling repair topping.
- P. Repair Methods not specified above may be used, subject to acceptance of Architect.

### 3.19 FOUNDATION WALLS

- A. The contractor shall form and leave openings in walls as shown on drawings and approved shop drawings for work of other contractors. These openings shall be temporarily closed and when so directed, the contractor shall point up in solid and neat manner with waterproofed cement.

### 3.20 WORK IN CONNECTION WITH OTHER TRADES AND CONTRACTS

- A. Sleeves, pockets, openings, etc., shall be set in the concrete walls and arches as required for the mechanical trades as shown on approved shop drawings; these shall be encased or built into the concrete work and shall be properly placed and secured in position in the forms before concrete is placed.
- B. Provide all chases, pipe slots, etc., required for the mechanical trades (see mechanical drawings), constructed as shown on the approved shop drawings.
- C. Leave temporary access panels where required to install mechanical equipment as required by trade affected. Panels shall be formed with construction joints as specified. Details for such panels shall be submitted to Architect for approval.
- D. Coordinate all penetrations, cutting, and patching with waterproofing contractor.

### 3.21 CUTTING AND PATCHING

- A. Contractor for concrete work shall be responsible for all cutting, removing and patching work where concrete surfaces are not installed within the limits shown on the drawings or specified herein. All such work shall meet with the approval of the Architect or Engineer of Record.
- B. Where cutting and patching is required to accommodate the work of other subcontractors, such cutting shall be done at the expense of said subcontractors but shall be performed by the contractor for concrete work.
- C. The location and extent of cutting in completed concrete work and the patching thereof shall meet with the approval of the Architect or Engineer of Record.

### 3.22 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The Commissioner will employ a testing laboratory to perform tests and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Commissioner.
  - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
  - 2. Slump: ASTM C 143; one test at point of discharge for each truck; additional tests when concrete consistency seems to have changed.
  - 3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each truck of air-entrained concrete.
  - 4. Concrete Temperature: Test hourly when air temperature is 40°F (4°C) and below, and when 80°F (27°C) and above; and each time a set of compression test specimens made.
  - 5. Compression Test Specimen: ASTM C 31; one set of 5 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
  - 6. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 25 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimens tested at 7 days, three specimens tested at 28 days, and one specimens retained in reserve for later testing if required.
    - a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
    - b. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
    - c. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified

compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

7. Water Cement Ratio Test: Check water content of concrete in accordance with 'Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying, AASHTO DESIGNATION: TP 23, SHRP DESIGNATION: 2027' for testing procedure.
8. Test results will be reported in writing to the Commissioner, Architect, Engineer of Record, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
  - a. Non Compliance: All test reports indicating non-compliance shall be faxed immediately to all parties on the test report distribution list and the hard copies submitted on different colored paper.
  - b. Nondestructive Testing: Windsor probes, sonoscope, or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
9. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

### 3.23 WASTE MANAGEMENT

- A. Separate and recycle waste materials to the maximum extent feasible.
- B. Collect cut off steel and discarded reinforcement steel and place in area for recycling.
- C. Place materials defined as hazardous or toxic waste in designated containers.
- D. Use trigger operated spray nozzles for water hoses and closed loop system to reduce water consumption.
- E. Reusable forms should be cleaned immediately after removal and non-reusable forms recycled to the maximum extent economically feasible.
- F. Incorporate crushed concrete or masonry materials in sub-base to the maximum extent feasible in accordance with sub-base specifications.
- G. Before concrete pours, designate location or uses for excess concrete. Options include:
  1. Additional paving
  2. Post footing anchorage

3. Landscaping -- site concrete features
4. Flowable fill

H. To avoid contamination of the local landscape, before concrete pours, designate a location for cleaning out concrete trucks where run-off can be contained, reused or incorporated. Options include:

1. Company owned site for that purpose
2. On-site area to be paved later in project

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## SECTION 033300

### ARCHITECTURAL CAST-IN-PLACE CONCRETE

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the architectural cast-in-place concrete as shown on the drawings and/or as specified herein.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Concrete work - Section 033000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
  - 1. ASTM C 618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Uses as a Mineral Admixture in Portland Cement Concrete
  - 2. ASTM C 311, Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
  - 3. ASTM C 989, Ground Granulated Blast-Furnace Slag for Use in Concrete Mortars
  - 4. Standard Practice ACI 226.R1. Ground Granulated Blast-Furnace Slag as a Cementitious Constituent in Concrete

B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:

1. Concrete materials of this Section shall contain post-industrial and/or post-consumer recycled content as follows:
  - a. Flyash: Concrete shall incorporate flyash as a replacement for at least 25% (by weight) of the portland cement. All design mixes are subject to review and approval by the Structural Engineer.
  - b. Ground Granulated Blast Furnace (GGBF) Slag: Concrete shall incorporate GGBF Slag as a replacement for at least 25% (by weight) of the portland cement. All design mixes are subject to review and approval by the Structural Engineer.
  - c. Recycled Steel: Reinforcing bar, rods, steel wire, welded wire fabric, anchors and ties, and miscellaneous steel accessories shall contain a minimum of 75% combined post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
  - d. Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
2. Concrete materials manufactured within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable
4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.

C. Special Experience Requirements

1. Installer: The contractor or subcontractor performing the work of this Section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

D. Special Inspections required:

1. Concrete Test Cylinders: Code Section BC 1905.6, Report required TR2.
2. Concrete Design Mix: Code Section BC 1905.3, Report required TR3.

## 1.5 STANDARDS

- A. In addition to requirements shown or specified herein and under Structural Concrete Section, comply with the recommendations of Chapter 11, Formwork Architectural Concrete, and Special Publication No. 4, Formwork for Concrete and ACI 303.1 "Standard Specification for Cast In Place Architectural Concrete", as published by ACI.

## 1.6 SUBMITTALS

### A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
  - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
  - b. The manufacturing location for the product(s) and the location (source) of the raw materials used to manufacture the product(s).
  - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content. Provide concrete mix designs indicating the amount of recycled content, by weight.
3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

### B. Samples - Submit

1. Cement; 3 to 6 oz. sample of cement submitted prior to design mixes and submitted for each delivery of each cement type to the batch plant during construction. Sample shall be labeled as to date, truck number, mill, lot number and bin number to which delivered.
2. Fine aggregate; each type, 1 lb.
3. Coarse aggregate; each type, 1 lb.
4. Form contact materials; each type, 12" square with flange.
5. Form gaskets; each type, 12" long.
6. Forms for reveals and rustication; each type, 12" long.
7. Reinforcement supports, chairs, tie wire; each type.

8. Form ties; each type.
  9. 12' x 12' x 2-1/2" thick samples with finish and treatment required for each type of cast-in-place concrete work using a mix of the required ingredients, strength and color matching the designated color sample. Concrete samples are to be cast vertical against the same form material to be used in the construction. Resubmit samples until approved by the Commissioner. Samples shall include the following finishes:
    - a. Off the form.
    - b. Light blast (with "black beauty").
    - c. Heavy blast (with "black beauty").
    - d. Acid etched.
    - e. Water washed.
  10. Full size mock-up panels.
- C. Shop Drawings: Prepare shop drawings for approval, including plans, elevations, sections, details and schedules as required to fully illustrate the work, including the Mock-up, and to meet project conditions. Shop drawings shall include but not be limited to the following:
1. Formwork
    - a. Submit detailed drawings showing the location of each panel including shop fabricated joints, field splice joints, tie locations, embedment locations, and clean-out openings. Specifically show details of bulkheads, reveals, recesses and corner assemblies and the means to be used to seal all joints and to maintain alignment.
    - b. Shop drawings shall have the stamp of a Professional Engineer registered in the State of New York.
  2. Reinforcing Steel: As per Section 033000.
    - a. Indicate cover, placing passages, accessories and any special detailing.
  3. Placing: Submit deposit sequence within each placement, including equipment and projected time between placements.

#### 1.7 MOCK-UP

- A. Do not proceed with construction of the mock-up until all other samples are approved by the Commissioner.
- B. Mock-up shall consist of a separate 4' high x 4' wide x 1'-6" thick panel constructed on the job site. It is the intent of this specification that the mock-ups serve as the ultimate basis for final in-place work. As such, all shop drawings, details, techniques, materials, formwork, and crews and foremen used to achieve the final approved mock-ups must also be utilized for further in-place work.
- C. Coordinate with other trades performing work on the mock-up.

- D. Prior to placing architectural concrete erect the mock-up at the job site, where directed, consisting of the elements indicated and conforming with the building details. Provide footings and bracing as required or needed to assure continuous stability of the mock-up.
- E. Install, patch, and finish concrete as specified for permanent work. Ensure that all agents and admixtures used in forming and pouring concrete can be cleaned from the work without staining, spotting, etc. Mock-up, when approved by the Commissioner, shall serve as the approved sample for architectural concrete work as to color, texture, patching and appearance.
- F. If mock-up is not approved by Commissioner, remove and replace with others at no additional cost to the City of New York.
- G. Protect and maintain approved mock-up throughout construction period and remove only when directed by the Commissioner.

#### 1.8 CONSTRUCTION CONFERENCE

- A. Within thirty (30) days following Notice to Proceed, the Contractor shall schedule a meeting at a mutually agreeable time to include the Commissioner, the Project Manager, the Concrete Supplier and the Formwork Manufacturer to discuss materials, methods of work and forming systems for architectural concrete work.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURER

- A. Basis of Design: Azzarone Contracting Corporation, Contact: Alan Bouknight, 516 742 4305. Or approved equal.

#### 2.2 CONCRETE MATERIALS

- A. Cement and Aggregates: Supply cement and aggregates from one domestic raw material and manufacturing source. Do not change source or type of cement or aggregate without Commissioner's written approval.
  - 1. Portland Cement: ASTM C 150 White.
  - 2. Fine Aggregate: ASTM C 33, clean natural sand and shall be consistent in color and gradation in screens finer than #16.
  - 3. Coarse Aggregate: ASTM C 33, clean crushed stone, free of material finer than #165 screen.
- B. Admixtures
  - 1. Air Entraining: Conform to ASTM C 260, and shall be compatible with other ingredients.
  - 2. High Range Water Reduction (Plant batched superplasticizer): ASTM C 404, Type F or G Containing no chlorides. HRWR shall be Rheobuild 716 by Masterbuilders or Daracem by W.R. Grace.

3. Other Admixtures: Do not use unless submitted for review and acceptance. Admixtures shall be certified in writing by the manufacturer to be in compliance with ASTM C 494.
  4. Color Admixtures: "Cromix" by L.M. Scofield Co. or equal by Davis Colors; color as selected by the Commissioner.
- C. Water: Conform to ACI 301, Chapter 2, Paragraph 203.

## 2.3 FORMWORK MATERIALS

- A. Smooth Surfaces
1. Flat wall surfaces shall be formed with plastic impregnated (min. 165 gr.), multi-layer (min. 14 plys/in), birch plywood, 3/4" thick. Panels shall be Finn-Form (Red) as distributed by Plywood and Door Corp., Union NJ.
- B. Form Gaskets (for sealing form panel joints): Gaskets shall be closed cell, foam rubber or neoprene, with pressure sensitive paperbacked adhesive on surfaces to be bonded to forms. Gaskets shall be of sufficient thickness, widths, and compressibility for specific use.
- C. Gasket adhesive remover shall not discolor concrete and thoroughly remove any adhered adhesive. Approved remover: Asphalt and tar remover #509 by ProSoCo, Kansas City, Kansas.
- D. Reveal Formers and Reformers: Resilient elastomeric with a wood core as manufactured by Scott Systems Inc., Denver, CO.
- E. Form Release Coating: Colorless, non-staining and having no deleterious effect on the concrete. Coating shall be Crete-Lease 727 or 880 by Cresset Chem Co. Weston, Ohio
- F. Form Ties: Ties shall be tapered stud She-Bolts, He-Bolts or Through-the-wall tapered ties. Ties shall leave a hole of not more than 9/16" in dia. on the concrete surface, and no metal closer than 1" from the surface. Ties shall be used with external spreading devices. Use stainless steel leave in material. Ties shall be:
1. She-Bolt by Williams Form Engineering, Grand Rapids, MI
  2. He-Bolt by Dayton/Superior Co., Folcroft, PA
  3. Through-Taper by Gates & Sons, Denver, CO
- G. Reinforcing: Provide as specified in other Concrete Sections except as hereafter modified:
1. All spacing and support devices shall be high density plastic or steel wire with plastic coated feet (Dipped type). Color of the plastic shall match the concrete color.
  2. Tie Wire: Tie wire at exposed surfaces or for all work above an exposed soffit or ceiling shall be non-corrosive plastic coated wire.

## 2.4 MISCELLANEOUS MATERIALS

- A. Waterproofing Sealer: Lithofin PSI – Premium Silicone Impregnator by VIC International Corporation. Note: Sealer must be compatible with all other sealants it comes in contact with (i.e. expansion joints, sealants or window etc.).
- B. Sealant: Sealant for concrete to concrete in revealed expansion, construction and control joints shall be as specified in Section 079200.
- C. Concrete Etching Solution: Shall be commercial concrete cleaner containing solvents, chloride acid, and stain removers. Accepted cleaner: Limestone Cleaner by ProSoCo, Kansas City, Kansas.
- D. Curing Materials: Curing compound shall conform to ASTM C309, and shall be colorless. Compound shall be CUR-TO-SPEC-MS by ProSoCo, Kansas City, Kansas.
- E. Any other miscellaneous materials required, but not specified herein, shall conform to the requirements of Section 033000.

## 2.5 MIXES

- A. General: Comply with Section 033000 except that slump shall be 4" plus or minus 1/2".
- B. All architectural concrete shall have water reducing agent.
- C. Mix shall be designed with low water content (max. 2"). Fluidity shall be attained with addition of high range water reducing agent to a slump of 6" + 1" (including high range water reducing agent in color admixture).

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where architectural cast-in-place concrete is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

### 3.2 FORMWORK

- A. Comply with Section 033000 except as hereinafter specified.
  - 1. Formwork foreman shall be experienced in architectural concrete formwork. Submit qualifications of foreman for approval.
  - 2. Design forms to permit easy removal. Prying against the face of concrete will not be allowed.
  - 3. The forms shall be completely rigid and strong enough to withstand without deflection, movement, or leakage, the full liquid head, and the high hydraulic pressures which result from rapid filling and high-frequency vibration.

4. Use screw-type fastening devices to align and close joints at contact face. Yoke beams and columns where possible with threaded rods and use diagonal rods to hold horizontal wales at corners. Install rods so that the tightening action acts to close form joints.
5. Form Panel Joints: All joints in formwork, wherever located, shall be sealed to remain watertight. Seal as follows:
  - a. Caulked - Butt board ends and plywood edges sealed on contact surfaces.
  - b. Gasketed - Joints erected and stripped in field. Form to form or form to concrete.
- B. Reveal Formers and Reformers: Fabricate and fasten to avoid protruding splinters which may become embedded in the concrete. Fasten to hold alignment during placing.
- C. Construction Joints: Joints shall be made only at revealed form joint locations shown on the architectural drawings. Spacing between construction joints shall be determined by the following:
  1. Maximum area of wall placement 300 sq. ft.
  2. Maximum dimension 15 ft.
  3. The formwork for second placements of construction joints shall be gasketed and held tight to the in-place concrete to prevent fluid loss.
- D. Plastic Surfaced Plywood: See architectural drawings for pattern of joints. Back fasten all contact material to supports. Penetrating the face is not permitted. Drill tie holes from contact face using brad point bits. All tie holes and cut edges shall be sealed as directed by the manufacturer.
- E. Form Ties: Locate as detailed on drawings symmetrically in level horizontal rows and plumbed vertically. Ties shown may be used as dummy ties or working ties. Tie cones shall be drawn tight against the contact face. Reusable portions of form ties shall be maintained free of rust and damage.
- F. Reuse of Forms: Forms may be reused only when properly maintained and in a satisfactory condition and approved by Commissioner. Forms which cannot be tightly butted and made watertight shall not be reused. If reuse of forms is approved by Commissioner, clean forms, and repair damaged surfaces.
- G. Cleaning and Coating of Forms: Clean all form contact faces uniformly and coat with coat of specified form release coating per manufacturer's written instructions. Remove excess form coating and do not allow coating to come in contact with previously placed concrete against which fresh concrete will be placed.
- H. Water Stops: Strip shall be applied to primed concrete surface as directed by the manufacturer. Strip shall be positioned at edge of joint adjacent to earth for sub-grade installation and inboard of the exterior layer of reinforcing steel for above-grade installations.

### 3.3 FORMWORK TOLERANCES

- A. Hydraulic Pressure; Design Forms, studs and walers to limit deflections between supports and stiffening members to  $L/400$  of the span.
- B. Finish Lines: Position formwork to maintain hardened concrete finish lines within the following permissible deviations.
  - 1. Variations From Plumb
    - a. In 10 ft.  $\pm 1/8$  in.
  - 2. Cross-Sectional Dimensions
    - a. Minus 1/8 in.
    - b. Plus 1/4 in.
  - 3. Surface Tolerances
    - a. Maximum offset between butt joints of individual
    - b. or ganged forms 1/32 in.
  - 4. Line of troweled edge at top of spandrel in 10 ft.  $\pm 1/8$  in.

### 3.4 REINFORCEMENT

- A. General: Comply with Concrete Section 033000, except as hereinafter modified:
  - 1. Concrete coverage over reinforcing steel, including bands shall be no less than 2 in. for architectural concrete surfaces, including beam bottoms. The Contractor shall notify the reinforcing steel fabricator that strict compliance to coverage requirements and bent bar details is extremely important.
  - 2. Tie wires shall be cut as closely as possible to the bars, and bent behind the bars in such a manner that concrete placement will not force the wire ends to the exposed concrete surfaces.
  - 3. Provide an unobstructed passage, min. 10" long, between the layers of reinforcing steel for placement of tremmies and trunks in placing the concrete. Passage shall be a maximum of 8'-0" apart, 4'-0" from each corner.

### 3.5 PLACING CONCRETE

- A. Coordination: The Batch plant, transit, conveying and placing operations shall be coordinated so that all concrete is in its final position within 1-1/2 hrs. (1 hr. when temperature is above 90 deg. F.) from the time the mix is charged with water. This coordination shall be performed so that any deposit load placed in the forms shall be covered by a subsequent deposit within 15 minutes and in a continuous manner. Truck delivery, truck changing, crane positions, bucket size, tremmie numbers and location, lift heights, etc. shall be planned and directed toward achieving homogeneous and consistent placements.

- B. General: Place concrete in accordance with Section 033000 except as hereinafter modified:
1. Clean truck mixer drums thoroughly prior to batching. Load truck mixers at the volume which will ensure a uniform batch at the slump specified. In the event that mixing is not uniform, the truck may either be rejected and not used on the project, or if warranted, allowed to mix only batches which will assure delivery of a uniform concrete of the specified slump.
  2. Handle concrete from the mixer to the place of final deposit as rapidly as practical by methods which prevent separation or loss of the ingredients.
  3. Clean transporting and handling equipment at frequent intervals and flush thoroughly with water before and after each day's run.
- C. Retempering: Do not place concrete in forms after it has taken initial set. Retempering of concrete which has partially set is prohibited.
- D. Clean Formwork: Formwork shall be clean and free from papers, sawdust, dirt and debris immediately prior to and during the time concrete is placed thereon. Spaces shall be thoroughly cleaned prior to closing formwork and maintained clean until concrete is placed. Formwork which will be in place and closed while other work is being carried out which could impair its cleanliness shall be provided with clean-out panels in surfaces not exposed to view, or with panels following approved joint lines; panels shall be noted on shop drawings. Just prior to placing concrete thoroughly inspect the interior of formwork and clean out all debris with vacuum cleaners, magnets, air or water jets as required.
- E. Vibration: Concrete shall be compacted thoroughly by vibrating using internal vibrators only to produce a dense, homogeneous mass without voids or pockets. Vibrators shall be placed in the concrete vertically and thoroughly blend adjacent deposits and layers. After top out leveling of all exposed spandrels the concrete shall be allowed to set 10 to 20 minutes then shall be given a final vibration, drawing the head out slowly to remove entrapped air. Immediately thereafter surface shall be hard troweled.
- F. All vibrating operations shall be performed by the same skilled person responsible for vibrating acceptable concrete in the mock-ups.

### 3.6 CURING AND PROTECTION

- A. Hot Weather Protection: Shall be in accordance with Section 033000.
- B. Curing: Apply curing compound immediately after form removal in accordance with manufacturer's recommendations for maximum moisture retention and colorless application.
- C. Protect all horizontal and vertical corners of concrete for full length or full height of exposed corner with continuous wood corner guards. In areas where high activity warrants, protect all vulnerable surfaces.

### 3.7 FORMED CONCRETE FINISHES AND TREATMENTS

- A. Finish and Treatment of Formed Concrete Surfaces: Architectural concrete formed surfaces shall have "as-cast" finish, using forms specified and where indicated on drawings. Concrete surfaces shall also receive the following treatment as indicated below:
1. Dressing, patching, texturing by etch cleaning, light and heavy blasting, and water washing, and the application of a water repellent.
- B. Final Finish Types: Apply the following finish types as required below:
1. Dressing: Shall mean removal of all runs, splatters, fins, projections, and stains, in a manner which avoids scarring, staining or scratching the surface.
  2. Patching Exposed Concrete: It is the intent of these specifications that the concrete work will be performed in a manner that no patching of exposed concrete will be required. In the event remedial action is accepted as a means of rendering work acceptable it shall consist of patching with a texture-matched technique and color matched mortar. Only areas designated by Commissioner will be patched. Patching shall be done after the application of texture treatment and before the water repellent application.
  3. Texturing of Concrete: All exposed surfaces shall receive the following treatment:
    - a. Light abrasive blast finish to match approved samples and mock-up.
    - b. All concrete to be treated shall be a minimum of twenty-one (21) days old.
    - c. Thoroughly clean work areas of waste material as soon as each segment of work is completed, and protect work which may be damaged by this operation in an accepted manner. Be responsible for fallout and for protecting persons, adjacent work and property. Comply with requirements of the Building Code and all agencies having jurisdiction.
    - d. Etch Cleaning
      - 1). Apply cleaner in an even manner break to break and joint to joint of surface, allow to set and flush in a consistent manner throughout project. Proceed in a manner approved by the product manufacturer.
      - 2). Treatment shall produce a "matte" surface by just removing the surface of the cement skin. Treatment shall not expose aggregate larger than that passing #20 screen.
    - e. Tie Holes: Tie holes requiring plugging will be plugged with concrete. Spalled or defective tie holes may be required to be patched with approved patching mortar, but only patch if required by Commissioner.
  4. Corners, whether horizontal or vertical, shall not be chamfered.
  5. Apply clear repellent Lithofin PSI by Vic International, to wall surfaces in one application following manufactures instructions.

END OF SECTION

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## SECTION 035300

### CONCRETE FLOOR TOPPING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the concrete floor topping as shown on the drawings and/or specified herein.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Carpentry - Section 062000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
  - 1. ASTM C 618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Uses as a Mineral Admixture in Portland Cement Concrete
  - 2. ASTM C 311, Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
  - 3. ASTM C 989, Ground Granulated Blast-Furnace Slag for Use in Concrete Mortars
  - 4. Standard Practice ACI 226.R1. Ground Granulated Blast-Furnace Slag as a Cementitious Constituent in Concrete

B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:

1. Concrete materials of this Section shall contain post-industrial and/or post-consumer recycled content as follows:
  - a. Flyash: Concrete shall incorporate flyash as a replacement for at least 25% (by weight) of the Portland cement. All design mixes are subject to review and approval by the Structural Engineer.
  - b. Ground Granulated Blast Furnace (GGBF) Slag: Concrete shall incorporate GGBF Slag as a replacement for at least 25% (by weight) of the Portland cement. All design mixes are subject to review and approval by the Structural Engineer.
  - c. Recycled Steel: Reinforcing bar, rods, steel wire, welded wire fabric, anchors and ties, and miscellaneous steel accessories shall contain a minimum of 75% combined post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
  - d. Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
2. Concrete materials manufactured within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable
4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.

C. Codes and Standards: ACI 301 "Specifications for Structural Concrete Buildings"; ACI 318, "Building Code Requirements for Reinforced Concrete"; and ACI 302; comply with applicable provisions.

D. Comply with ACI 302 section 7.7.2 and 7.8.

E. Special Inspections required:

1. Concrete Test Cylinders: Code Section BC 1905.6, Report required TR2.
2. Concrete Design Mix: Code Section BC 1905.3, Report required TR3.

#### 1.5 MOCK-UP IN CONJUNCTION WITH FINISH TRADES

A. Mockups: Cast topping mockups to demonstrate expansion joints, one saw cut control joint, surface finish, bonding, texture, tolerances, and standard of workmanship.

1. Build mockups approximately 6 foot by 6 foot in the location indicated or, if not indicated, as directed by Commissioner.
2. Notify Commissioner seven days in advance of dates and times when mockups will be constructed.

3. Obtain Commissioner's approval of mockups before starting construction.
4. If Commissioner determines that mockups do not meet requirements, demolish and remove them from the site and cast others until mockups are approved.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

B. Demolish and remove mockups when directed.

#### 1.6 SUBMITTALS

A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113-1.5: Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
  - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
  - b. The manufacturing location for the product(s) and the location (source) of the raw materials used to manufacture the product(s).
  - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content. Provide concrete mix designs indicating the amount of recycled content, by weight.
3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

B. Manufacturer's Data: Submit manufacturer's product data with installation instructions for materials including reinforcement, admixtures, joint materials, curing materials and others as requested by Commissioner.

C. Laboratory Reports: Submit 2 copies of laboratory test or evaluation reports for concrete materials and mix designs. Do not use mix until approved by Engineer.

1. Mix Proportions and Design: Proportion mixes complying with mix design procedures specified in ACI 301.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. Basis of Design: Azzarone Contracting Corporation, Contact: Alan Bouknight, 516 742 4305. Or approved equal.

### 2.2 MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III.
- B. Standard Aggregate: ASTM C 33.
- C. Standard Topping: Design mix to produce topping material with following characteristics:
  1. Slab thickness: 1-1/2 inch.
  2. Compressive strength, 4000 psi minimum.
  3. Slump, 4" maximum.
  4. Cement per cu. yd., 590 lb. minimum.
  5. W/C ratio, 0.51 maximum.
- D. Mixing: Provide batch type mechanical mixer for mixing topping material at project site. Equip batch mixer with a suitable charging hopper, water storage tank, and a water-measuring device. Use mixers which are capable of mixing aggregates, cement and water into a uniform mix within specified time, and of discharging mix without segregation.
  1. Mix each batch of 2 cu. yds. or less, for at least 1-1/2 minutes after ingredients are in mixer. Increase mixing time 15 seconds for each additional cu. yd. or fraction thereof.
- E. Joints: Provide control and construction joints as indicated or required based on existing construction. Use standard pre-molded joint filler at perimeters finished with backer-rod and sealant.
- F. Reinforcing: Wire mesh reinforcing complying to ASTM A 185, 6 x 6, 10 gauge.
  1. 0 to 3" depth of topping slab
  2. Temperature reinforcement where recommended by Structural Engineer.
- G. Bonding Agent: "Weld-Crete" or approved equal.
- H. Sealer: "Super Diamond Clear Vox" by Euclid or approved equal.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where concrete floor topping is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Design Consultant.

### 3.2 INSTALLATION

- A. Topping Applied to Hardened Concrete: Remove dirt, loose material, oil, grease, paint or other contaminants, leaving a clean surface.
  - 1. Base slab surface shall be roughened by shot blasting a minimum of 1/16" in depth.
- B. After shot blasting apply bonding agent as per manufacturer's instructions.
- C. Placing and Compacting: Spread topping mixture with reinforcing evenly over prepared base, bring to required level with straight-edge and strike-off. After placement, do not work surface further until ready for floating. Begin floating when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power driven floats. Consolidate surface with power-driven floats, or by hand floating if area is small or inaccessible to power units.
- D. Slab Finishes
  - 1. Screed to true and level alignment unless indicated sloped on drawings, then uniformly slope as indicated.
  - 2. Tool all salient edges of concrete.
  - 3. Do not absorb water with neat cement.
  - 4. Make sharp arrises at wall to floor conditions unless otherwise indicated.
  - 5. Finish/steel trowel.
  - 6. Finish shall be high penetrating satin sheen absorptive coating.
- E. Check and level surface plane to tolerance not exceeding 1/4" in 10'-0" when tested with a 10'-0" straightedge. Cut down high areas and fill low areas. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth finish.
  - 1. Apply sealer as per manufacturer's instructions.
- F. Performance: Failure of concrete topping to bond to substrate (as evidenced by a hollow sound when tapped), or disintegration or other failure of topping to perform as a floor finish, will be considered failure of materials and workmanship. Repair or replace toppings in areas of such failures.

END OF SECTION

## SECTION 035416

### CEMENT LEVELING COMPOUND

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the cement leveling compound as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Self-leveling cement compound applied over existing concrete substrates, thickness shall be 3/4" minimum.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 048419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Concrete work - Section 033000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
  - 1. ASTM C 618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Uses as a Mineral Admixture in Portland Cement Concrete
  - 2. ASTM C 311, Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
  - 3. ASTM C 989, Ground Granulated Blast-Furnace Slag for Use in Concrete Mortars

4. Standard Practice ACI 226.R1. Ground Granulated Blast-Furnace Slag as a Cementitious Constituent in Concrete
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. Concrete materials of this Section shall contain post-industrial and/or post-consumer recycled content as follows:
    - a. Flyash: Concrete shall incorporate flyash as a replacement for at least 25% (by weight) of the portland cement. All design mixes are subject to review and approval by the Structural Engineer.
    - b. Ground Granulated Blast Furnace (GGBF) Slag: Concrete shall incorporate GGBF Slag as a replacement for at least 25% (by weight) of the portland cement. All design mixes are subject to review and approval by the Structural Engineer.
    - c. Recycled Steel: Reinforcing bar, rods, steel wire, welded wire fabric, anchors and ties, and miscellaneous steel accessories shall contain a minimum of 75% combined post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
    - d. Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Concrete materials manufactured within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Applicator: Company specializing in performing the work of this Section with a minimum of 3 years experience and approved by the manufacturer of the product used.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113-1.5: Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s) and the location (source) of the raw materials used to manufacture the product(s).

- c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  - 2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content. Provide concrete mix designs indicating the amount of recycled content, by weight.
  - 3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  - 4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Submit catalog information and product data for material to be used.
  - C. Submit approval letter as required by Article 3.1, para. B. herein.
- 1.6 PRODUCT HANDLING
- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
  - B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.
- 1.7 REGULATORY REQUIREMENTS
- A. Conform to New York City Building Code for combustibility or flame spread requirements.
- 1.8 MOCK-UP
- A. Construct a mock-up of underlayment material, 8 feet long by 8 feet wide.
  - B. Locate where directed by the Commissioner.
  - C. Approved mock-up may remain as part of the Work.
- 1.9 JOB REQUIREMENTS
- A. Do not install underlayment until floor penetrations and peripheral work are complete.
  - B. Maintain minimum ambient temperatures of 50 degrees F. 24 hours before, during, and 72 hours after installation of underlayment.

- C. During the curing process, ventilate spaces to remove excess moisture and until underlayment is dry, allow a minimum of seven (7) days.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. Subject to the requirements specified herein, provide one of the following products:
  - 1. "DSP-520" made by H.B. Fuller Co.
  - 2. "Super Flo-Top" made by Euclid Chemical Co.
  - 3. "K-15" made by Ardex.
  - 4. "Ultraplan 1 Plus" by the Mapei Corp. (rapid setting).
  - 5. "Novoplan 2" by the Mapei Corp. (standard setting).

### 2.2 MATERIALS

- A. Underlayment: One of the above listed products.
- B. Water: Potable and not detrimental to underlayment mix materials.
- C. Primer: Manufacturer's recommended type.
- D. Joint and Crack Filler: Latex based.

### 2.3 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Mix to achieve following characteristics:
  - 1. Density: 115 lb./cu. ft. minimum dry density.
  - 2. Compressive Strength: 4,000 psi minimum in accordance with ASTM C-109.
  - 3. Fire Hazard Classification: Flame/Smoke rating of 0/0 in accordance with ASTM E286.
- C. Mix to self-leveling consistency.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where cement leveling compounds are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

- B. Manufacturer's representative must inspect surfaces to receive cement leveling compound and approve those surfaces in writing to the Commissioner prior to start of application.

### 3.2 PREPARATION

- A. Vacuum clean surfaces; remove any material (curing compounds, film, dirt) that would be detrimental to bond of cement leveling compound.
- B. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- C. Close floor openings.

### 3.3 APPLICATION

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Place to minimum 3/4" thickness.
- C. Place before partition installation.
- D. Transition to existing floor; use stiff mix to slope to align with existing adjacent floor.

### 3.4 CURING

- A. Air cure in accordance with manufacturer's instructions.

### 3.5 APPLICATION TOLERANCE

- A. Top Surface: Level to 1/8 inch in 10 ft.

### 3.6 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over unprotected floor underlayment surfaces and until underlayment is completely dry.

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## SECTION 040100

### MASONRY RESTORATION AND CLEANING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the masonry restoration and cleaning at rear façade where windows are removed and new ones installed as shown on the drawing A300 and/or specified herein, including, but not limited to, the following:
  - 1. Cleaning existing face brick walls.
  - 2. Re-pointing existing face brick walls.
  - 3. Replacing existing damaged face brick.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Unit masonry - Section 042000.
- F. Sealant - Section 079200.

##### 1.4 CODES

- A. ASTM C 618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Uses as a Mineral Admixture in Portland Cement Concrete
- B. ASTM C 311, Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
- C. ASTM C 989, Ground Granulated Blast-Furnace Slag for Use in Concrete Mortars
- D. Standard Practice ACI 226.R1, Ground Granulated Blast-Furnace Slag as a Cementitious Constituent in Concrete

## 1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Special Experience Requirements
1. Installer: The contractor or subcontractor performing the work of this Section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.
- C. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. Recycled Steel: Reinforcing bar, rods, steel wire, welded wire fabric, anchors and ties, and miscellaneous steel accessories shall contain a minimum of 75% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
  2. Concrete Masonry Units manufactured within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for interior work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Concrete masonry units (CMU) shall contain post-industrial and/or post-consumer recycled content (if available) as follows
    - a. Flyash: CMUs shall incorporate flyash as a replacement for at least 5% (by weight) of the Portland cement. All design mixes are subject to review and approval by the Structural Engineer.
    - b. GGBF (Ground Granulated Blast Furnace) Slag: CMUs shall incorporate GGBF Slag as a replacement for at least 10% (by weight) of the Portland Cement. All design mixes are subject to review and approval by the Structural Engineer.
    - c. Certification of recycled content shall be in accordance with the Submittal Requirements of This section.
- D. Field-Constructed Mock-Ups: Prior to start of general masonry restoration, prepare the following sample panels on the building where directed by Commissioner. Obtain Commissioner's acceptance of visual qualities before proceeding with the work. Retain

acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging completed work.

1. Cleaning: Demonstrate materials and methods to be used for cleaning each type of masonry surface and condition on sample panels of approximately 25 sq. ft. in area.
  - a. Test adjacent non-masonry materials for possible reaction with cleaning materials.
  - b. Allow waiting period not less than seven (7) calendar days, after completion of sample cleaning to permit study of sample panels for negative reactions.
2. Repointing: Prepare two (2) separate sample areas of approximately 3' high by 6' wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints.

#### 1.6 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113-1.5: Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s) and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied for the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM. Mortar mix designs shall be included to verify the amount of recycled material included, by weight.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as stated below. Cut sheets shall be submitted with the Construction Manager or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a

product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

- B. Product Data: Submit manufacturers' technical data for each product indicated including recommendations for their application and use and VOC compliance. Include test reports and certifications substantiating that products comply with requirements.
- C. Restoration Program: Submit written program for each phase of restoration process including protection of surrounding materials on building and site during operations. Describe in detail materials, methods and equipment to be used for each phase of restoration work.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.
- B. Deliver other materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.
- C. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.
- D. Protect grout, mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

#### 1.8 PROJECT CONDITIONS

- A. Clean masonry surfaces only when air temperatures are 40 deg. F. and above and will remain so until masonry has dried out, but for not less than seven (7) days after completion of cleaning.
- B. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 deg. F. and 80 deg. F. and will remain so for at least forty-eight (48) hours after completion of work.
- C. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- D. Protect sills, ledges and projections from mortar droppings.

## 2.2 SEQUENCING/SCHEDULING

- A. Perform masonry restoration work in the following sequence:
  - 1. Repair existing masonry including replacing existing masonry with new masonry materials.
  - 2. Rake-out existing mortar from joints indicated to be repointed.
  - 3. Repoint existing mortar joints of masonry indicated to be restored.
  - 4. Clean existing masonry surfaces.

## PART 2 PRODUCTS

### 2.1 MASONRY MATERIALS

- A. Provide face brick conforming to the requirements of Section 042000.
- B. For mortar materials, conform to the requirements of Section 042000.

### 2.2 CLEANING MATERIALS AND EQUIPMENT

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- B. Alkaline Prewash Cleaner: Manufacturer's standard alkaline cleaner for prewash applications only which are followed by acidic cleaner of type indicated for afterwash.
  - 1. Product: Subject to compliance with requirements, provide "Sure Klean 766 Prewash," ProSoCo, Inc.,
  - 2. or approved equal.
- C. Acidic Cleaner: Manufacturer's standard strength acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids including trace of phosphoric acid and combined with special wetting systems and inhibitors.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. "Diedrich 101 Masonry Restorer," Diedrich Chemicals.
    - b. "Sure Klean Restoration Cleaner," ProSoCo, Inc.
    - c. or approved equal.
- D. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film forming, strippable masking material for protecting glass, metal and polished stone surfaces from damaging effect of acidic and alkaline masonry cleaners.
  - 1. Products: Subject to compliance with requirements provide one of the following:
    - a. "Diedrich Acid Guard," Diedrich Chemicals.
    - b. "Sure Klean Acid Stop," ProSoCo, Inc.

c. Or approved equal.

- E. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, at rates required by the manufacturer, measured at spray tip, and for volume.
1. For spray application of chemical cleaners provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.
  2. For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 15 degrees.

### 2.3 MORTAR MIXES

- A. Measuring and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.
1. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1-to-2 hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within thirty (30) minutes of final mixing; do not retemper or use partially hardened material.
- B. Colored Mortar: Produce mortar of color required by use of selected coloring agent.
- C. Do not use admixtures of any kind in mortar, other than colorant.
- D. Mortar Proportions
1. Pointing Mortar for Brick: One part white Portland cement, 2 parts lime and 6 parts colored mortar aggregate. Add colored mortar pigment to product mortar colors required to match.
  2. Rebuilding Mortar: Comply with ASTM C 270, Proportion Specification, Type N, with cementitious material content limited to Portland cement-lime and coloring agent.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where masonry restoration and cleaning are to be performed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Commissioner.

### 3.2 PROTECTION

- A. General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.
- B. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.
  - 1. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.
  - 2. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
  - 3. Dispose of run-off from cleaning operations by legal means and in manner which prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
  - 4. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.
- C. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

### 3.3 CLEANING EXISTING MASONRY, GENERAL

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.
- B. Use only those cleaning methods indicated for each masonry material and location.
- C. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.
- D. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.
- E. Water Application Methods: Prior to chemical cleaning, apply water application to mock-ups by spray at various pressures to determine if masonry surfaces can be cleaned adequately and to the Commissioner's satisfaction in this manner. If water applications prove ineffective, proceed with chemical cleaners.
- F. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations. Do not allow chemicals to

remain on surface for periods longer than that indicated or recommended by manufacturer.

1. For hard to remove dirt or grime, apply pre-wash cleaner prior to application of chemical cleaner; follow manufacturer's instructions.

### 3.4 BRICK REMOVAL AND REBUILDING

#### A. Brick Removal

1. Carefully remove by hand any brick which are damaged, spalled or deteriorated. Cut out full units from joint to joint and in manner to permit replacement with full size units.
2. Support and protect masonry indicated to remain which surrounds removal area.
3. Salvage as many whole, undamaged bricks as possible.
4. Remove mortar, loose particles and soil from salvaged brick by cleaning with brushes and water. Store brick for reuse.
5. Clean remaining brick at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.

#### B. Brick Rebuilding

1. Install new or salvaged brick to replace removed brick. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required use motor driven saw designed to cut masonry with clean, sharp unchipped edges.
2. Lay replacement brick with completely filled bed, head and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure that units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.
3. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.

### 3.5 REPOINTING EXISTING MASONRY

#### A. Joint Raking

1. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2" nor less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.

3. Do not spall edges of masonry units or widen joints. Replace any masonry units which become damaged.
  - a. Cut out old mortar by hand with chisel and mallet.
  - b. Power operated rotary hand saws and grinders will be permitted but only on specific written approval of Commissioner based on submission by Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

B. Joint Pointing

1. Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8" until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
3. After joints have been filled to a uniform depth, place remaining pointing mortar in three (3) layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in a damp condition for not less than seventy-two (72) hours.
6. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than thirty (30) days before beginning cleaning work.

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## SECTION 042000

### UNIT MASONRY

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the unit masonry work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Concrete block walls and partitions.
  - 2. Door and window stone sills.
  - 3. Brick and stone masonry to match existing at areas to be enlarged.
  - 4. Metal joint reinforcing, anchors, ties, weeps, closures and related accessories for masonry.
  - 5. Control and expansion joints in masonry, filled with joint fillers.
  - 6. Chases, recesses, pockets and openings in masonry as required for installation of work by others.
  - 7. Building in of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
  - 8. Grouting in of metal items built into masonry work.
  - 9. Protection, pointing and cleaning of masonry.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Firestops and smoke seals - Section 078413.

F. Sealant - Section 079200.

1.4 SUBMITTALS

A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications.
2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.

B. Submit Shop Drawings for the following:

1. Anchoring details.
2. Control and expansion joint locations and details.

C. Submit Samples for the following:

1. Joint reinforcing, each type, width and proposed location (labeled).
2. Anchors, wedges and ties, each type, width and proposed location (labeled).
3. Joint filler, each type.
4. Stone sills.

D. Submit technical and installation information for the following:

1. Mortar materials, each material and mortar type.
2. Certification of mortar mix.
3. Flashing material, descriptive literature.

4. Concrete block, joint reinforcing, anchors, ties and joint filler; submit manufacturer's technical and descriptive literature.
5. Block manufacturer shall submit certifications of compliance with ASTM C 90, C 331 and UL 618 prior to any job site delivery. Field sampling of concrete block may be tested by an Independent Testing Laboratory retained by the City of New York according to the requirements of ASTM C 140.

E. Construction Procedures (Submit the following)

1. Procedures and materials for cleaning masonry work; including certification that cleaner will not adversely affect stone, gaskets, sealants, etc.

1.5 QUALITY ASSURANCE

A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

B. Conform to the following non-cumulative tolerances (any masonry work not meeting these standards shall be re-built as directed by the Commissioner).

1. Variation from the plumb:

- a. In lines and surfaces of columns, walls and arrises:
  - 1). In 10 feet 1/8"
  - 2). In any story of 25 feet maximum 1/4"
- b. For external corners, expansion joints and other conspicuous lines:
  - 1). In any story of 25 feet maximum 1/4"

2. Variation from the level or the grades indicated on the drawings; for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

- a. In any bay or 20 feet maximum 1/4"

3. Variation of the linear building lines from established position in plan related portion of columns and partitions:

- a. In any bay or 20 feet maximum 1/4"

4. Variation in cross-sectional dimensions of columns and in thickness of walls:

- a. Minus 1/8"
- b. Plus 1/8"

5. Variation in dimensions of masonry openings:

- a. Horizontal dimension -0" + 1/16"
- b. Vertical dimension +0" - 1/16"

C. Work of this Section shall conform to the requirements of the following:

1. 2005 ACI 530/ASCE 5/TMS 402 Building Code Requirements for Masonry Structures.
2. 2005 ACI 530-1/ASCE 6/TMS 602 Specifications for Masonry Structures.

D. Pre-Construction Conference: Prior to installation of masonry and associated work, Contractor shall arrange a meeting with Masonry Subcontractor, installers of related work, and other entities concerned with masonry wall performance, including the Commissioner and City of New York. Contractor shall record discussions and agreements and furnish copy to each participant. Provide at least seventy-two (72) hours' advance notice to participants prior to convening conference. Review methods and procedures related to masonry work, including, but not limited to, the following:

1. Review masonry requirements (drawings, specifications and other Contract Documents).
2. Review required submittals, both completed and yet to be completed.
3. Review and finalize construction schedule related to masonry work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
4. Review required inspection, testing, certifying and material usage accounting procedures.
5. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
6. Coordinate work with air/vapor barrier membrane and related flashing, review details to avoid conflicts.

#### 1.6 PRODUCT HANDLING

- A. General: Deliver, store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Store all masonry units and mortar materials on raised platforms and under ventilated and waterproof cover. Store packaged materials in manufacturer's unopened containers, marked with manufacturer's name and product brand name. Immediately reseal containers after partial use. Remove and replace damaged materials.
- B. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.
- C. Aggregate: Store with provisions for good drainage.
- D. Reinforcement and Anchors: Store and protect so that when placed, joint reinforcement and anchors will be free of soil, dirt, ice, loose rust, scale, or other

coatings which would destroy or reduce bond with mortar, and will not be disfigured or bent out of shape.

#### 1.7 CODE REQUIREMENTS

- A. Work of this Section shall conform to all applicable requirements of the New York City Building Code.
  - 1. Concrete block shall comply with Reference Standard RS-10.
  - 2. Concrete blocks shall be type approved by the Board of Standards and Appeals.
    - a. Concrete blocks used for fireproofing shall conform to New York City Building Code requirements and shall provide ratings required by the Contract Documents.
- B. Fire rated masonry partitions shall have MEA number.
- C. Conform to New York City Local Law 17-95 for Seismic Requirements.
- D. Comply with New York City Section 32-05 of Chapter 32 of Title 1 of the Official Compilation of the Rules of the City of New York regarding "Impact Resistant Stair and Elevator Enclosures" when such enclosures are of masonry construction.

#### 1.8 JOB CONDITIONS

- A. In cold weather, when the outside temperature is below forty (40) degrees F., conform to the requirements of "Cold Weather Masonry Construction and Protection Recommendations" publication by Brick Industry Association (BIA). No anti-freeze admixtures are permitted.
- B. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg. F. and above.
- C. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24" down both sides and hold cover securely in place.
  - 2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24" down face next to unconstructed wythe and hold cover in place.
- D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Brick and Stone: Match Existing, including all attachments and anchors. All anchors for stone shall be stainless steel, and brick hot dip galvanized.
- B. Standard Concrete Block
  1. Portland cement, ASTM C 150, Type 1, low alkali (less than 65) one source.
  2. Aggregates, ASTM C 331, lightweight expanded shale, clay or slate aggregates, manufactured by the rotary kiln process equal to "Solite," "Norlite," or "Haydite."
    - a. All block shall be from one aggregate type and from one manufacturer.
  3. Concrete Masonry Units: Load bearing lightweight aggregate concrete masonry units conforming to the requirements of ASTM C 90.
    - a. Block for rated walls shall be 75% solid units.
    - b. All other block may be hollow units.
  4. The producer of the concrete masonry units shall furnish certification from an independent testing laboratory confirming that all 8" or larger masonry units meet all of the UL 618 requirements for two (2) hours or better (as required), referencing full scale fire test reports (ASTM E 119). All 4" and 6" units shall conform to "National Bureau of Standards" and "National Research Council" full scale fire tests.
  5. Sizes and Shapes: Nominal face size 8" x 16" by thickness as indicated on drawings, with stretcher units, jamb units, header units, square corner units (at ends and corners of exposed or painted work), sash units (at control joints within masonry wall), lintel units and other special shapes and sizes required to complete the work.
  6. Finish: For exposed or painted block surfaces, in addition to ASTM requirements, block shall have uniformly dense, flat, fine grain texture, with no cracks, chips, spalls, or other defects which would impair appearance. For concealed CMU, surfaces shall be free from deleterious materials that would stain plaster or corrode metal.
  7. Curing: All concrete block shall be steam cured, and air dried for not less than thirty (30) days before delivery.

8. Density of concrete block shall not exceed one hundred and five (105) lbs. per cubic foot.
9. Shrinkage: Shrinkage of concrete blocks shall not exceed 0.065% when tested in accordance with ASTM C 426-99.
10. Water Content
  - a. At the time of delivery to the job site, concrete masonry units shall have a value, in weight of contained water, of not more than thirty (30) percent of the fully saturated content for the unit tested.
  - b. Ship all units from the factory, and store at the job site, with all necessary protection to prevent increase of water content from rain and other sources.

C. Joint Reinforcing for Masonry Walls

1. For block walls forming part of exterior wall construction, provide super heavy duty reinforcing fabricated of 3/16" dia. side and cross rods, truss or ladder design, ties, spaced every block course. Provide prefabricated pieces at corners and intersections of walls or partitions.
  - a. Reinforcing assembly shall be hot dip galvanized steel finish conforming to ASTM A 153 with zinc coating of 1.5 oz. of zinc per sq. ft., after fabrication.
2. For interior block walls and partitions, provide standard reinforcing fabricated of 9 ga. side and cross rods, truss or ladder design, no ties, spaced every other block course. Provide prefabricated pieces at corners and intersections of walls or partitions. Reinforcing shall be mill galvanized conforming to ASTM A 641, Class B-1, applied after fabrication.
3. Wire used in assemblies noted above shall be cold drawn steel wire conforming to ASTM A 82.
4. Approved Joint Reinforcing Manufacturers
  - a. Hohmann & Barnard
  - b. Wire-Bond
  - c. Heckmann Building Products
  - d. National Wire Products Industries, Inc.

D. Anchors and Ties

1. For anchoring masonry to structural steel, provide hot-dip galvanized steel, as listed, or approved equal by manufacturer noted above in Para. C.61:
  - a. Made by Heckmann Building Products. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.
    - 1). No. 195 Column Anchors
    - 2). No. 197 Column Anchors
    - 3). No. 315 Weld-On Anchor Rods with No. 316 Triangle Ties
    - 4). No. 315-B Weld-On Anchor Straps with No. 316 Triangle Ties

- b. Made by Hohmann & Barnard or approved equal. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.
  - 1). No. 355 Column Anchors
  - 2). No. 356 Column Anchors
  - 3). No. 357 Beam Anchors
  - 4). No. 359 F anchor straps with VWT tie.
- 2. For anchoring CMU interior partitions to underside of steel beams, provide hot dip galvanized steel tube anchors equal to No. 419 and No. 421 made by Heckmann Building Products, No. PTA-420 made by Hohmann & Barnard, or approved equal by manufacturer noted above in Para. C.6.
- 3. For anchoring CMU interior partitions to underside of structural deck, provide 4" x 4" x 1/4" galvanized steel angles (ASTM A 36), 3'-0" long spaced 3'-0" o.c. alternately on each side of partition. Anchor partition securely to structural deck.
- E. Reinforcing Bars and Rods: ASTM A 615, Grade 60. See Drawings for size.
- F. Control and Expansion Joint Fillers
  - 1. Vertical Installation Within Concrete Masonry Wall: Extruded high grade neoprene rubber, cross shape, for use with concrete masonry sash units, which shall provide a force fit in the grooves of the sash block, and shall have 1/2" diameter tubular ends (compressed 25% when installed in 3/8" wide joint).
    - a. Provide the following sizes:
      - 1). 2-5/8" wide control joint fillers for 4" block walls.
      - 2). 4-5/8" wide for 6" block walls.
      - 3). 6-5/8" wide for 8", 10" and 12" block walls.
    - b. Provide backer rod and sealant joint over joint filler as per drawings and Section 079200 of these specifications.
  - 2. Isolation Joint Filler at Abutting Construction and at Intersecting CMU Walls: Compressible and resilient closed cell neoprene gasket with pressure sensitive adhesive backing, thickness 30% greater than thickness of joint. Acceptable joint filler shall be "Everlastic, Type NN-1" by Williams Products, Inc., or approved equal. Recess joint filler and install backer rod and sealant as per drawings and Section 079200 of these specifications.

## 2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, standard color, one source.
- B. Hydrated Lime: ASTM C 207, Type S, as manufactured by Corsons, or approved equal.
- C. Sand: Clean, washed, buff colored sand, graded per ASTM C 144.
- D. Water: Clean, fresh and suitable for drinking.

## 2.3 STONE

### A. Stone

1. Stone Quality and Characteristics: All stone shall be of best quality, sound stock, and carefully selected; uniform in color, pattern, markings, texture and finish; and free from defects impairing strength, durability or appearance such as cracks, seams, mineral stains, flaws, or imperfections which are not a normal characteristic of the stone. Patching or filling of chips or cracks is not permitted. Delivered stone shall match the approved samples, and any stone not matching the approved sample may be rejected by the Architect as unfit. Size and thickness of stone units as indicated on drawings.
2. Stone: Stone shall be as selected by Architect.

## 2.4 MORTAR MIX

- A. Exterior Block Construction and Stone Sills: Provide Portland cement/lime mortar as noted above conforming to ASTM C 270, Type N.
- B. Interior Masonry Construction: Provide Portland cement/lime mortar conforming to ASTM C 270, Type N, for load bearing conditions, mortar shall conform to ASTM C 270, Type M.
- C. Reinforced Concrete Block: Provide Portland cement/lime mortar conforming to ASTM C 270, Type S.
- D. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.
- E. Mixing
  1. General: Add cement just before mixing and mix dry. Use sufficient amount of water as necessary to produce workable mix. Mix in small batches to make plastic mass.
  2. Mixing: Machine mix all mortars in approved type mixer with device to accurately and uniformly control water. Add hydrated lime dry. Mix dry materials not less than two (2) minutes. Add water, then mix not less than three (3) minutes. Mix only amount of mortar that can be used before initial set. Do not use mortar which has reached its initial set or two (2) hours after initial mixing, whichever comes earlier. Mortar may not be re-tempered. Clean mixer for each batch, whenever mortar type is changed, and at end of each day's work.
  3. Acceleration or other admixtures not permitted.
  4. Mortar shall have a flow after suction of not less than seventy-five (75) percent of that immediately after mixing as determined by ASTM C 91.
- F. Admixtures

1. No air-entraining admixtures or cementitious materials containing air-entraining admixtures shall be used in the mortar.
2. No antifreeze compounds or other substances shall be used in the mortar to lower the freezing point.
3. Calcium chloride or admixtures containing calcium chloride shall not be used in mortar.

### PART 3 EXECUTION

#### 3.1 SURFACE CONDITIONS

##### A. Inspection

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that masonry may be completed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.
3. Do not start any work until mock-ups are approved by the Commissioner.

##### B. Discrepancies

1. In the event of discrepancy, immediately notify the Commissioner in writing.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Starting of work by the Contractor means acceptance by the Contractor of the substrate.

#### 3.2 COORDINATION

- A. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this Section.

#### 3.3 PREPARATION

- A. Concrete Block: Do not wet concrete block units.

#### 3.4 INSTALLATION

##### A. General

1. Build walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.
2. Build chases and recesses as shown or required for the work of other trades.

3. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
4. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and off-sets. Avoid the use of less than half size units at corners, jambs and wherever possible.
5. Lay up walls plumb and true with courses level, accurately spaced and coordinated with other work.
6. Provide templates made of steel studs for plumbing of two story masonry openings.
7. Pattern Bond: Lay exposed masonry patterns as noted on drawings. If not shown, provide running bond. Lay concealed concrete block with all units in a wythe bonded by lapping not less than two (2) inches. Bond and interlock each course of each wythe at corners. Do not use units of less than four (4) inches horizontal face dimensions at corners or jambs.
8. Where possible, masonry walls and partitions shall be built after all overhead ducts, pipes and conduits are in place and tested. Masonry shall be neatly built around the items above. Walls and partitions shall be plumb, true to line and free from defects such as open cells, voids, dry joints and other similar defects. In rooms and spaces scheduled to have concrete block finish, all such surfaces including upper wall surfaces up to termination of structural ceiling in spaces without suspended ceilings, shall be made suitable for paint application. Cutting of openings in walls and partitions in place shall be done only with the approval of the Commissioner.

B. Mortar Bedding and Jointing

1. Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on exterior walls and in all courses of piers, columns and pilasters, where solid CMU is used and where adjacent to cells or cavities to be reinforced or filled with concrete or grout.
2. Lay masonry walls with 3/8" joints unless otherwise shown on drawings.
3. Tool exposed joints slightly concave. Concealed joints shall be struck flush.
4. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

C. Stopping and Resuming Work: Rake back 1/2 block length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

D. Built-In Work

1. As the work progresses, build in items specified under this and other Sections of these specifications. Fill in solidly with masonry around built-in items.
2. Mortar in door frames, access doors, louvers and other metal items embedded or built into masonry work solidly with mortar as the masonry units are laid up.
3. Grout under lintels, bearing plates, and steel bearing on masonry with solid bed grout.
4. Sleeves, pipes, ducts and all other items which pass through masonry walls shall be caulked with interior grade sealant meeting requirements of Section 079200, so as to be air tight and prevent air leakage. Refer to Section 078413 for packing of voids in rated masonry walls.
5. Fill vertical cells of masonry units solid with grout which have anchoring, reinforcing rods, supporting or hanging devices embedded in the cell including stone anchors and window or curtain wall anchors.
6. Fill vertical cells of masonry units solid with mortar on each side of door frames to sixteen (16) inches beyond.
7. Unless otherwise noted, fill vertical cells of masonry units solid with grout which are below steel bearing plates, steel beams, and ends of lintels, to eight (8) inches beyond bearing and from floor to bearing.
8. Place wire mesh in horizontal joint below masonry unit cells to be filled with mortar, to prevent mortar from dropping into unfilled cells below.
9. Masonry indicated as being reinforced shall have all voids filled solid with grout. Grout shall be consolidated in place by vibration or other methods which insure complete filling of cells. When the least clear dimension of the grouted cell is less than two (2) inches, the maximum height of grout pour shall not exceed twelve (12) inches. When the least clear dimension is two (2) inches or more, maximum height of grout pour shall not exceed forty-eight (48) inches. When grouting is stopped for one (1) hour or longer, the grout pour shall be stopped 1-1/2" below the top of a masonry unit. Vertical bar reinforcing shall be accurately placed and held in position while being grouted, and shall be in place before grouting starts. All such reinforcing shall have a minimum clear cover of 5/8". Lap all bars a minimum of forty (40) bar diameters and provide steel spacer ties (not to exceed 192 bar diameter) to secure and position all vertical steel and prevent displacement during grouting. Provide continuous horizontal reinforcement embedded in mortar joints every second course.

E. Cutting and Patching

1. All exposed masonry which requires cutting or fitting shall be cut accurately to size with motorized carborundum or diamond saw, producing cut edges.
2. Do not saw cut any masonry openings in face brick construction without Commissioner's approval and after a procedure has been reviewed and approved.

3. Holes made in exposed masonry units for attachment of handrail brackets and similar items shall be neatly drilled to proper size.
4. All masonry which requires patching in exposed work, if approved by Commissioner, shall be patched neatly with mortar to match appearance of masonry as closely as possible and to the Commissioner's satisfaction. Rake back joints and use pointing mortar to match as required.

F. Solid Wall Construction

1. Fill the vertical longitudinal joint between wythes solidly with mortar by parging the in-place wythe and shoving units into the parging.
2. Tie wythes with continuous horizontal reinforcement embedded in mortar joints sixteen (16) inches o.c. vertically.

G. Interior Block Partitions

1. Build to full height unless otherwise shown on drawings. At non-rated partitions fill void between CMU and structural deck with continuous neoprene filler. At fire rated partitions, fill void with fire stop material meeting the requirements of Section 078413. Fasten to structure at top of partition using steel angles as specified herein.
2. Provide continuous horizontal joint reinforcing every other block course, except as otherwise noted. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8". Lap reinforcement a minimum of six (6) inches at ends of units.
3. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
4. Corners
  - a. Provide interlocking masonry unit bond in each course at corners.
  - b. Provide continuity at corners with prefabricated "L" reinforcement units, in addition to masonry bonding.
5. Intersecting and Abutting Walls
  - a. Unless vertical control joints are shown as part of structural frame, provide interlocking masonry bond. Provide starters and special shapes as shown on the drawings to bond these walls.
  - b. In addition to masonry bonding, provide horizontal reinforcement using prefabricated "T" units at interior partitions.

H. Ties and Anchors for Masonry Construction

1. Provide ties and anchors as shown or specified, but not less than one metal tie, spaced not to exceed sixteen (16) inches o.c. horizontally and/or vertically.

Provide additional ties within 1'-0" of all openings and spaced not more than 24" apart around perimeter of openings.

2. Anchor masonry to structure complying with the following:
  - a. Provide an open space not less than 1/2" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.

I. Control and Expansion Joints

1. Provide vertical expansion, control and isolation joints in masonry as shown. Build in related items as the masonry work progresses.
2. CMU Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 40'-0" o.c. In addition, locate joints at points of natural weakness in the masonry work, including the following:
  - a. At structural column or joint between bay.
  - b. Above control joints in the supporting structure.
  - c. Above major openings at end of lintels upward and below at ends of sills downward. Place at one side of jamb for openings not less than 7'-0" wide and at both sides for openings over 6'-0" wide.
  - d. At reduction of wall thickness.
  - e. Where masonry abuts supporting structure.
  - f. If additional joints are required, indicate same on approved shop drawings.

J. Lintels

1. Install loose steel lintels furnished by Section 055000, allowing eight (8) inch bearing at ends.
2. For concrete block walls, use specially formed U-shaped concrete block lintel units with reinforcing bars in accordance with the following table, filled with grout.

Number and Size of Reinforcing Bars Required at Concrete Block Lintels		
Maximum Clearance Span	Wall Width	Rebar No. - Size
2'-0" to 6'-0" 6'-0" to 8'-0"	6"	2 - #3 2 - #4
2'-0" to 6'-0" 6'-0" to 8'-0"	8"	2 - #3 2 - #4
2'-0" to 6'-0" 6'-0" to 8'-0"	12"	3 - #3 3 - #4

3.5 CANTS

- A. Provide specified mortar for cement cants at beams and other projections in elevator shafts, where adjoining wall is of masonry construction. Cants shall slope seventy (70) degrees from the horizontal.

3.6 CLEANING, PROTECTION, ADJUSTMENT

A. Protection

1. The Contractor shall take adequate precautions for the protection of all surfaces against mortar spatter, and shall immediately remove any such spatter should it inadvertently occur, leaving no stain or discoloration.
2. Excess mortar shall be wiped off the masonry surfaces as the work progresses.
3. Wood coverings shall be placed over all such masonry surfaces as are likely to be damaged during the progress of the entire project.
4. Protective measures shall be performed in a manner satisfactory to the Commissioner.
5. Damaged masonry units shall be replaced to satisfaction of the Commissioner.
6. Exterior masonry walls shall be draped with waterproof covering until copings are in place, to prevent water penetration in cavity.

- B. Cleaning of Masonry: Upon completion, all exposed masonry shall be thoroughly cleaned following recommendations of the BMI Technical Note No. 20. Before applying any cleaning agent to the entire wall, it shall be applied to a sample wall area of approximately 4' x 4' in a location approved by the Commissioner. No further cleaning work may proceed until the sample area has been approved by the Commissioner, after which time the same cleaning materials and method shall be used on the remaining wall area. If stiff brushes and water do not suffice, the surface shall be thoroughly saturated with clear water and then scrubbed with a solution of an approved detergent masonry cleaner, equal to "Vana Trol" made by ProSoCo Inc. or equal made by Diedrich or approved equal, mixed as per manufacturer's directions, followed immediately by a thorough rinsing with clear water. All lintels and other corrodible parts shall be thoroughly protected during cleaning.

- C. Pointing: Point any defective joint with mortar identical with that specified for that joint.

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SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes but is not limited to the following as shown on the drawings and as specified herein:

1. Furnish and deliver for installation by others, anchor bolts, bearing plates and loose lintels with complete instructions and templates to facilitate installation.
2. Furnish and erect all struts, columns, bearing plates, beams, girders, bracing, hangers and all related connections (bolted and welded).
3. Openings (unreinforced and reinforced) in structural steel to accommodate mechanical and electrical work.
4. Shop painting and field touch-up painting.
5. Erection bracing and supports, including steel wedges, shims or nuts required for leveling base plates.
6. Lintels and angles attached to structural steel as shown on drawings.
7. Unless specifically excluded, furnish and install all other items for structural steel work indicated on the drawings, specified, or obviously needed to make the work of this Section complete.
8. Waste Management

- B. Related Requirements:

1. Division 01 Section "Construction Waste Management and Disposal"
2. Division 03 Section "Cast in Place Concrete"
3. Division 04 Section "Unit Masonry"
4. Division 05 Section "Metal Deck."
5. Division 07 Section "Waterproofing."
6. Division 07 Section "Joint Sealants."
7. Division 31 Section "Dewatering."

- C. Related Work Specified Elsewhere

1. Grout under base and bearing plates.
2. Installation of loose lintels furnished under this section.
3. Miscellaneous metal work
4. Stair framing and hangers.
5. Field painting of structural steel, except as specified herein.
6. Fireproofing systems.

### 1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Heavy Sections: Rolled and built-up sections as follows:
  - 1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches .
  - 2. Welded built-up members with plates thicker than 2 inches .
  - 3. Column base plates thicker than 2 inches .

### 1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of all connections required by the drawings to be completed by structural steel fabricator (including comprehensive engineering analysis by a qualified professional engineer) to withstand loads indicated and comply with other information and restrictions indicated, unless noted otherwise.
  - 1. Select and complete connections using schematic details indicated and AISC 360.
  - 2. Use design method indicated on structural drawings.
  - 3. Moment Connections: Fully restrained unless otherwise noted on drawings.

### 1.5 SUBMITTALS

- A. Product Data: Submit data for each type of product indicated in the contract documents.
- B. Shop Drawings: Submit shop drawings in accordance with the specifications as follows:
  - 1. Show clearly all work, including relationship of structural steel to the adjacent work of other trades and to significant lines of finishes of other trades.
  - 2. Do not fabricate or deliver work to the site before drawings reviewed by the Commissioner and Architect/Engineer of Record have been returned.
  - 3. Before preparing steel shop drawings, submit proposed submittal schedule for review by the Commissioner and Architect/Engineer of Record.
  - 4. Before preparing steel shop drawings, submit for review a set of job standards showing all necessary joint details with full particulars of connection pieces, shop and field welds, and holes for erection bolts and permanent bolts. These shall include any moment and shear connections. Appropriate marks for designating all types and sizes of joint details shall be included. After approval of these job standards, the erection plans are to be submitted and shall be marked to indicate unmistakably the type and size of joint to be used for every beam connection. Do not order steel in advance of approval of the job standards and the erection plans with joint marks, except at own risk
  - 5. Submit calculations for design of connections on job standards and all other connections such as moment and brace frames. Calculations shall be signed and sealed by a Professional Engineer licensed in the state in which the project is located.
  - 6. Prepare remainder of steel shop drawings after approval of job standards and erection plans. Drawings submitted prior to approval of job standards will be returned without review.
  - 7. Prepare shop drawings in conformance with the applicable procedures shown in "*Detailing for Steel Construction*," latest edition, published by AISC. Prepare shop drawings under the supervision of competent engineering personnel, licensed by the state

- in which the construction is to take place. During the preparation of shop drawings, and prior to submittal, coordinate and cross check all shop drawings, including those prepared by subcontractors, for compliance with the Contract Documents.
8. Indicate clearly the size and grade of steel for each component. Identify rolled shapes, tubes and plates by using the standard designations used in "Steel Construction Manual" Latest Edition, by AISC.
  9. Indicate welds and nondestructive tests by using the symbols conforming to AWS A2.4 "Symbols for Welding and Nondestructive Testing." Where necessary for clarity, indicate welding procedure designations or other data in the tail of the welding symbol.
  10. Show explicitly the type of connection used in each location, the grade, size, and number of bolts; the type, number, position, designation and orientation of each washer; and the size of each hole, whether slotted or round. Ensure that adequate wrench clearance for correct bolt tightening is provided and note special bolt tightening sequences where applicable and necessary.
  11. Show all camber dimensions in the shop drawings. Where specific camber is not shown in the drawings, note on each affected shop drawing that such members are to be fabricated with the natural camber up.
  12. Show holes required for securing work specified in other sections to structural steelwork, as well as all holes required for passage through structural steelwork of work of other trades. Provide field work drawings for all such holes not shown in shop or erection drawings. Addition of, or change in size or location of openings will not be permitted without prior approval.
  13. Use bolted connections wherever possible; avoid field welding unless otherwise noted on drawings.
  14. Make details in such a way as to avoid having steel, connections, bracing, bolts, etc., interfere with architectural details or in any way reduce the areas of shafts, openings, clearances, etc.
  15. Detail and schedule cleaning and painting data and requirements, including specific indication of "no-paint" areas.
  16. The use of the Architect's or Engineer of Record's electronic drawing files as a base for the erection shop drawings will be permitted at the request of the structural steel detailer upon completion and return of the waiver form. The use of the Architect's or Engineer of Record's electronic drawing files as a base for shop drawing details will be not be permitted. The structural steel detailer will be responsible for compatibility of the files with his hardware or software. The electronic files are not to be considered the contract documents, the design team makes no representation regarding the accuracy or completeness of the electronic files given to the structural steel detailer and their use will be at the structural steel detailer's sole risk and without liability to the design team. The structural steel detailer shall remove the project title box and all references to the structural drawings including drawing numbers and structural drawing sections and details. The structural steel detailer shall also remove all reference to work not included in the steel contract.
  17. Show clearly the size and location of each member and the erection mark assigned to each member. Show each field connection with all data and details necessary for assembling the structure. Direct special attention to the possible need for special guying, bracing, or shoring to prevent deformation of existing or new structure due to stresses caused by erection procedures and equipment, by construction loadings, and by forces of natural phenomena.
  18. Prepare, keep up-to-date, and submit a complete drawing index cross-referencing each assigned piece mark with the drawing number in which the piece is detailed. Detail drawings submitted without an up-to-date index and the applicable erection drawing(s) showing the location of each piece will be deemed an incomplete submission and will not

- be accepted as subject to any agreed shop drawing review schedule.
19. Prepare anchor bolt and base plate erection drawings containing complete location and placing details, including details of all templates. Provide anchor bolt erection drawings to the concrete trade in advance of applicable concrete work and in coordination with concrete construction sequence.
  20. Submit, in writing, any proposed deviations from the Contract Documents, prior to the submission of shop drawings showing the proposed deviation. Submit requests for deviations on the steelwork subcontractor's letterhead. Deviations not identified, or identified only in letters of transmittal or in shop drawings or both, without the required written request, may not be accepted, and shall be sufficient cause for the Commissioner to return each shop drawing containing such deviations without further action. Acceptance of shop drawings containing deviations not detected by the Commissioner during shop drawing review shall not relieve the steelwork subcontractor from responsibility to conform strictly to the Contract Documents.
  21. Prior to resubmission of shop drawings with additions or corrections, circle or bubble and identify all changes. Drawings submitted without each change being clearly identified are subject to return for resubmission.
  22. Prior to making shop drawings for any portion of the work involving alterations to an existing structure, make all necessary field observations, measurements and surveys of existing conditions. If probes are required to accomplish such measurements, give timely notice where probes will be required.
- C. Submit certified copies of each survey conducted by a surveyor licensed by the state in which the construction is to take place and employed by the structural steel subcontractor. Survey shall show elevations and locations of base plates and anchor bolts to receive structural steel, and final elevations and locations for major members. Indicate discrepancies between actual installation and Contract Documents.
- D. Reports:
1. Submit certified copies of mill test reports for all steel furnished. Perform mechanical and chemical tests for all material regardless of thickness or use.
  2. Submit certification of recycled steel content. Certification shall clearly indicate post-consumer AND post-industrial recycled steel content for the particular member or members used.
  3. Submit mill and fabricator certification of compliance with ISO14001.
  4. Submit anchor bolt checking certification as required.
  5. Submit qualification certificates of all welders who will perform work on the project.
  6. Submit survey of erected steelwork as required.
- E. Submit verification of bio-degradable or low VOC, and low Hazardous Air Pollutants (HAPS) cleaning solutions. Provide a cut sheet for all cleaning solutions used in the surface preparation of steel components. Highlight VOC limits and chemical component limits.

## 1.6 QUALITY ASSURANCE

- A. Except as modified by this specification, comply with the applicable provisions and recommendations of the following codes and standards:
1. New York City Building Code, Latest Edition
  2. AISC "Specification for the Design, Fabrication and Erection of Structural Steel for

- Buildings".
3. AISC "Code of Standard Practice for Steel Buildings and Bridges" latest edition.
  4. AISC "Seismic Provisions for Structural Steel Buildings", latest edition.
  5. Industrial Fasteners Institute "Handbook of Bolt and Bolted Joints" latest edition.
  6. RCSC "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts."
  7. ASTM A 6 "General requirements for rolled steel plates, shapes, sheet piling and bars for structural use".
  8. AWS D1.1, "Structural Welding Code."
  9. AWS A5.18 & A5.28, Structural Welding Code for GMAW
  10. SSPC "Painting Manual, Volume 2, Systems and Specifications.", Latest edition.

B. Qualifications for welding work shall be as follows:

1. Qualify welding procedures and welding operators in accordance with the AWS "Standard Qualification Procedure."
  - a. Include amended requirements of the building code as noted above.
2. Submit certification that all welders to be employed in work are AWS qualified. If re-certification of welders is required, retesting will be responsibility of structural steel subcontractor.
  - a. Include licensing requirements as per the building code noted above and local jurisdiction.

- C. Special Experience Requirements: The apparent low bidder shall demonstrate their experience as it relates to the NYPL Woodstock Branch Renovation project, and the Bidder and each major subcontractor shall have completed in a timely fashion a minimum of three (3) similar projects in scope and type within the past five (5) consecutive years. Each Contractor shall submit the names of three (3) projects that provide the most relevant experience for the project, in terms of scale, cost, quality, and type of construction and criticality of schedule. Include the project cost and the start and completion dates for each referenced project. Include client references for each project, including contact person and phone number. Failure to meet these qualification requirements may result in the disqualification of the bid. The references and qualification information shall be submitted within 2 weeks of the notice to the apparent low bidder. Failure to submit the qualifications within the time required may result in disqualification of the bid.

## 1.7 TESTING AND INSPECTION

- A. Special Inspection as required by the applicable Building Code of all structural steelwork in the shop and field will be performed by an inspection agency retained by the The City of New York at no expense to the Contractor. The inspection agency shall work under the direction of the Commissioner. Contractor shall provide the inspection agency with the following:
1. Schedule of all work in both shop and field with at least ten days' written notice before commencement of either activity.
  2. A complete set of approved shop and erection drawings.
  3. Cutting lists, order sheets, material bills, shipping bills and mill test reports.
  4. Information as to time and place of all rollings and shipment of material to shops.
  5. Representative sample pieces as requested by the testing agency.

6. Full and ample means and assistance for testing all material.
  7. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and field.
- B. Each person installing connections shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the inspector can refer back to the person making the connection.
- C. The following minimum criteria shall be adhered to in testing of welds and bolts:
1. All welds and bolts shall be examined by visual means.
  2. 25% of all welds, selected randomly, shall be measured.
  3. 25% of all bolts, selected randomly, shall be checked with calibrated torque wench.
  4. In addition, all welds subject to tensile stress shall be examined by the Ultrasonic Method for 100% of their length.
  5. 10% of all manual fillet welds shall be tested by the magnetic particle method.
  6. 1'-0" at each end of automatic fillet welds shall be tested by the magnetic particle method.
  7. 100% of groove welds shall be tested by the ultrasonic method.
- D. Shop inspection will include examination of steel for straightness and alignment, fissures, mill scale, and other defects and deformities, as described in ASTM A6, examination of fabricated pieces for conforming to approved shop drawings, testing of bolts and welds, and inspection of shop painting. All shop welds shall be visually inspected and spot tested using Ultrasonic Method ASTM E 114 and AWS, Chapter 6, Part C. All inspected welds shall be identified by the inspector.
- E. Field inspection will include examination of erected steel for welding, proper fitting and tensioning of bolts, alignment, trueness and plumbness, touching-up of shop coat, level of billets and base plates.
- F. Inspection of welding will be such as to assure that the work is within the quality requirements specified below and elsewhere in this section of the specifications and will include:
1. Ascertainment that the electrodes and flux used for the SAW, GMAW and FCAW welding processes conform to the requirements of this section of the specifications.
  2. Ascertainment that the approved welding procedures and sequence are followed without deviation, unless specific approval for change is obtained from the Engineer of Record.
  3. The testing agency shall be prepared to utilize the following approved methods of testing:
    - a. Liquid penetrant inspection: ASTM E 165.
    - b. Magnetic particle: ASTM A 709.
    - c. Radiographic inspection: ASTM E 94 and E 1032.
    - d. Ultrasonic inspection: ASTM E 114 and AWS, Chapter 6, Section C.
- G. When defects are revealed, additional inspection by whatever method is deemed necessary by the inspector, shall be performed to the extent necessary to assure that the full amount of defect has been located. No further work shall be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects shall be repaired, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Engineer of Record. Inspection of the repaired weld shall be by the same method that was used to reveal the defect. A second repair of a defective area shall not be made without approval of the Engineer of Record.

- H. Apparatus and procedure for measuring torque and tension in high strength bolts and for calibrating wrenches shall be furnished and maintained by steel contractor, and shall be approved by the inspection agency. Wrenches shall be calibrated each day at the beginning of the work, each time the bolt size or length of pressure hose is changed, and at such other times as the inspection agency may direct. Periodic checks of high strength steel bolt connections will be made in the field by the inspection agency. The steel contractor shall maintain at all times during erection a manual torque wrench, and shall provide a laborer and scaffolding as required for the testing of connections by the inspection agency, and shall at his own expense, furnish such facilities and provide such assistance as may be required for proper inspection.
- I. A distinguishing mark will be placed on all work that has been inspected and approved. Material or work that is not acceptable will be designated by words such as "REJECT" or "REPAIR" marked directly on the material or work.
- J. Inspection of Shop Painting:
  - 1. Visually evaluate surface preparation by comparison with pictorial standards in accordance with SSPC-Vis 1.
  - 2. Measure dry film thickness of each coat with a magnetic film thickness gauge in accordance with SSPC-PA 2.
  - 3. Visually inspect dried film for runs, sags, dry spray, overspray and missed areas.
  - 4. Repair defective or damaged areas in accordance with painting requirements specified. Architecturally exposed structural steel shall be free of runs and holidays. Make repairs to shop or field coat as directed.

#### 1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work. Minimize the disturbances to site and soil conditions.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time not to delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members in a safe, dry, off ground location, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration, discoloration or staining.
- D. Do not store materials on structure in a manner that might cause distortion or damage to members of supporting structures. Repair or replace damaged materials or structures as directed.

#### 1.9 PROJECT CONDITIONS

- A. The structural steel contractor shall coordinate the structural steel work with the work of other Contracts. Verify all dimensions and details of this Contract and those of other Contracts that affect the work before proceeding. Any discrepancies shall be immediately reported to the Commissioner.
- B. Be fully responsible for the accurate installation of the work. Any discrepancy which arises from his failure to execute the work in conformity to the drawings and specifications shall be properly remedied at the contractor's own expense and in a manner acceptable to the

Commissioner.

- C. Locate dimensionally on setting plans all anchor bolts, inserts, bearing and base plates, etc., and prepare and deliver all required templates and fully dimensioned setting plans in time for the proper execution of the work. Anchor bolts shall be set by another subcontractor. The structural steel contractor shall check all such settings for correctness after they have been cast in place, and before proceeding with erection work.
- D. Report to the Commissioner and certify compliance with the above checking requirements in writing and indicate any inaccuracies found in the location of anchor bolts or inserts, and corrections which must be made to their installation. Any inaccuracies not included in the report and found during or after steel erection shall be the responsibility of the structural steel contractor and the cost of corrective measures shall be borne by him.
- E. Use base lines, bench marks, or other standards for survey work that have been provided or verified by others. If permanent building bench marks have been established, these will be used for field checking.
- F. Coordinate with all other trades to insure that work of this section does not cause undue conflict. Insure that location of erection devices such as cranes, derricks, booms or hoists, does not cause over-stresses to steel frame to work previously placed by other trades or to existing structures. When required, retain the services of a licensed professional engineer to ascertain that erection devices do not create unsafe conditions or cause overstresses.
- G. Ensure full co-ordination with other related trades and professions.

#### 1.10 SUBSTITUTION

- A. Commissioner reserves the right to require substitute shapes of other sizes than those indicated on the drawings when it is apparent that the shapes specified cannot be furnished within the time required for the progress of construction. Make said substitutions without additional cost to the Commissioner.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Steel shapes, including structural steel wide flange and structural tee rolled shapes, channels, angles, plates, pipe, and hollow structural sections: As noted on structural drawings.
- B. High Strength Bolts:
  - 1. Slip-critical bolts as noted on structural drawings, with hardened washers
- C. Anchor Bolts: As noted on structural drawings
- D. Filler metal for welding electrodes. As noted on structural drawings.
- E. Structural steel primer paint: rust inhibitive primer conforms to the following criteria

1. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
2. Demonstrate a minimum opacity as determined by ASTM D 2805
3. Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894
4. "Slip Critical" compatible rating where applicable
5. The product shall not contain any of the prohibited compounds as listed in Green Seal *Standard for Paintings and Coatings*, GS-11, latest edition and in Master Painters Institute (MPI) *Green Performance Standard*, GPS-1-08.
6. The product shall meet the VOC limits as set forth in the MPI Green Performance Standard, GPS-1-08, with a maximum allowable VOC of 340 g/L for rust preventative coatings. Limits are expressed in THINNED state. Preference shall be given to products with the least crystalline silica content.
7. The product shall meet all the requirements of MPI Standards: 23, 26, 76, 79, 95, 107, 135, 173, 275. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category.
  - a. Exterior exposed steel, normal conditions: Use alkyd or polyamide solvent based paints (MPI #'s 76, 79 & 101)
  - b. Interior exposed steel: Use water based paint (MPI # 107)
  - c. Special Applications, highly corrosive environments: Use zinc rich paints (MPI #'s 20 & 200)

F. Structural steel field paint for exposed members: rust inhibitive primer conforms to the following criteria

1. Demonstrate a minimum of adhesion as classified by 4B of ASTM D 3359 method A
2. Demonstrate a minimum opacity as determined by ASTM D 2805
3. Demonstrate corrosion resistance per standards ASTM B 117 & ASTM D 5894
4. "Slip Critical" compatible rating where applicable.
5. The product shall not contain any of the prohibited compounds as listed in Green Seal *Standard for Paintings and Coatings*, GS-11, latest edition and in the Master Painters Institute *Green Performance Standard*, GPS-1-08.
6. The product shall meet the VOC limits as set forth in the MPI Green Performance Standard, GPS-1-08, with a maximum allowable VOC of 400 g/L for rust preventative coatings. Limits are expressed in THINNED state. Preference shall be given to products with the least crystalline silica content.
7. The product shall meet all the requirements of MPI Standards: 23, 26, 76, 79, 95, 107, 135, 173, 275. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category. Products not listed with MPI are acceptable if and only if they meet the same environmental criteria for the same product category.
  - a. Exterior exposed steel, normal conditions: Use alkyd or polyamide solvent based paints (MPI #'s 23, 79)
  - b. Interior exposed steel: Use water based paint (MPI # 107)

## PART 3 - EXECUTION

### 3.1 FABRICATION

- A. All shop connections shall be high strength bolted unless specifically shown otherwise.

Fabricate work in shop in as large assemblies as practicable. Use welded connections ONLY where shown on drawings. If a bolted connection is not possible obtain written approval from the Engineer of Record for the welded connection.

- B. Camber: As indicated on drawings.
- C. Mill column ends and bearing stiffeners to give full bearing over the cross section. Plane contact surfaces of bearing plates when required by the AISC Specifications. It is not necessary to plane bottom surfaces of plates on grout beds.
- D. Drill or punch holes at right angles to the surface of the metal, not more than 1/16" larger than the connector diameter. Do not make or enlarge holes by burning. Drill material having a thickness in excess of the connector diameter and material thicker than 7/8". Holes shall be clean-cut without torn or ragged edges. Remove outside burrs resulting from drilling operations.
- E. Provide holes in members to permit connection of the work of other trades. Use suitable templates for proper location of these holes. Steel requiring adjustment or accurate alignment shall be provided with slotted holes or full bearing shims as shown.
- F. Provide holes, slots and openings required by other trades together with necessary reinforcing required. Use suitable templates for proper location of these openings. All such openings shall be shown on the shop drawings. No change in size or location will be permitted without prior approval.
- G. Manual flame cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is within 1/8" of the required line.

### 3.2 SHOP CONNECTIONS

- A. Provide connections as shown on the drawing exactly as detailed. Where connections are not detailed, the minimum connections shall comply with appropriate tables headed, "Framed Beam Connections" shown in the AISC "Manual of Steel Construction" unless otherwise noted on the drawings. Use high strength bolts unless otherwise shown.
- B. Do not use welded connections unless shown on details. Field welding is not allowed without written instruction from the Engineer of Record.
- C. Proportion and detail all connections on shop drawings to resist forces shown on design drawings. If no reactions are indicated on design drawings, design connections for non-composite beams to resist the end reaction shown in the AISC tables for Uniform Load Constants for Beams. Connections for composite beams shall be proportioned to resist 150% of the above mentioned tabulated load.
- D. Bolting
  - 1. Bolts shall be of a length that will extend not less than 1/4" beyond the nuts. Enter bolts into holes without damaging the thread.
  - 2. Use high-strength bolts in friction as shown. Make high-strength bolted joints without the use of erection bolts. Bolt heads and nuts shall rest squarely against the metal. Where structural members have sloping surface, bolted connections shall be provided with beveled washers to afford square seating or framing for bolt heads or nuts. Bring

members tightly together with sufficient high-strength "fitting-up" bolts which shall be retightened as all the bolts are finally tightened. Manual torque wrenches will not be accepted for final tightening. Protect bolt heads from damage during placing. Final tightening of high-strength bolts shall be by properly calibrated power torque wrenches. Bolts that have been completely tightened shall be marked for identification.

#### E. Welding

1. The following environmentally preferable welding processes shall be used as described for the related application without exception:
  - a. Submerged Arc Welding (SAW): Plate girders, fillet and butt joints in pipes, cylinders, columns and beams, and welds where 'downhand' or horizontal positions are possible.
  - b. Gas Metal Arc Welding (GMAW) shall be used where SAW is not applicable (such as for angled connections and anything irregular or short).
  - c. Field welding shall be allowed only in special circumstances; in such cases Flux Core Arc welding (FCAW) shall be specified
2. Do not begin structural welding until joint elements are inspected for surface preparation, fit-up, and cleanliness of surface to be welded and are then bolted or tacked in intimate contact and adjusted to dimensions shown on drawings, or both, with allowance for any weld shrinkage that is expected. No members are to be spliced without prior approval by the Engineer of Record.
  - a. Containment surface preparation debris must meet SSPC-Guide 6 guidelines.
3. Pre-heat and interpass temperature shall be in accordance with Table 4.2 (including footnotes) of the AWS Code for Welding in Building Construction. The temperature shall be measured from the side opposite to that which the pre-heat is applied, where possible.
4. All groove welds shall be continuous and full penetration welds unless otherwise shown on the design drawings. Welds made without the aid of a back-up bar shall have their roots chipped, ground or roughened out to sound metal from the second side, before welding is done from the second side.
5. All welds shall be sound throughout. There shall be no crack in any weld or weld pass. Weld may be considered sound if it contains only slight porosity or fusion defects which are well dispersed.
6. The heat, input, length of weld and sequence of weld shall be controlled to prevent distortions. The surfaces to be welded and the filler metals to be used shall be subject to inspection before any welding is performed.

### 3.3 SHOP PAINTING AND CLEANING

#### A. Finishing, coating, plating

1. Shop painting and factory finishing shall be preferred to field painting whenever possible. Where applicable, finishes and surface preparations based on a physical process such as abrasive blasting, grinding, buffing and polishing are preferred to coatings and solvent based cleaning. Where coatings are necessary powder-coated fabrication is preferred to painting and plating. Avoid plated metals especially those using cadmium and chromium

as plate material or cyanide or copper/formaldehyde based electroless copper as the plating solution.

- B. Remove all rust, scale, grease and other detrimental foreign matter in accordance with SSPC-SP 3, Power Tool Cleaning, unless conditions/opportunities listed below apply.
  - 1. Use surface preparation classification recommended by paint manufacturer, SSPC or Master Painters Institute (MPI) for paint product used.
    - a. SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations, must be followed for all applicable surface preparation techniques.
- C. Immediately after surface preparation, apply structural steel primer paint where specified, in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 2.0 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces. Use type of primer paint as specified in "Materials" article above. Apply two coats to surfaces that will be inaccessible after erection
- D. Paint all structural steel in accordance with the foregoing specification, except as follows:
  - 1. Steel which is to receive spray-on fireproofing.
  - 2. Within 2" of field welds or welds made after paint is applied.
  - 3. Within 3" of high strength friction bolts.
  - 4. Machined surfaces and threaded parts required for adjustment of the structure. Protect these with suitable rust inhibiting coating which may be removed after final installation of the work so that proper finished coatings may be applied.

### 3.4 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
  - 1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.

### 3.5 SOURCE QUALITY CONTROL

- A. Refer to testing and inspection requirements specified above.

### 3.6 EXAMINATION

- A. Verify field measurements prior to start of erection. Check the alignment and elevation of all column supports and location of all anchor bolts with transit and level instruments before starting erection. Notify the Commissioner of any errors. Obtain Commissioner's approval of methods proposed for correcting errors prior to proceeding with corrections and erection.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.7 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

### 3.8 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- C. Column billets and bearing plates shall be supported and aligned on steel wedges, shims, or leveling nuts. After the supported members have been plumbed and properly positioned by instrument and anchor nuts tightened, the entire bearing area under the plate shall be packed solidly with grout specified in another Section. Wedges and shims shall be set back a minimum of 3/4" from the edges of plates and shall be left in place. Leveling plates are not permitted.
- D. Plumbing, Leveling and Bracing
  - 1. Structural steel shall be erected true and level, and temporary bracing shall be introduced wherever necessary to provide for all loads to which the structure may be subjected, including equipment and the operation thereof. Such bracing shall be left in place as long as may be required for safety. No welding shall be done or bolts drawn up tight until structural steel has been properly aligned. Obtain approval for guy locations to assure lack of interference with operations of other trades.
- E. Drifting
  - 1. Light drifting necessary to draw holes together will be permitted, but drifting of unfair holes will not be permitted. Twist drills shall be used to enlarge holes as necessary to the next larger size; use next larger size bolts as required. Reaming that weakens the members, or make it impossible to fill the holes properly or to adjust accurately after reaming, will not be allowed.

### 3.9 FIELD CONNECTIONS

- A. In addition to the requirements for shop connections comply with the following:
  - 1. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 2. Joint Type: As noted on structural drawings.
- B. Weld Connections: Comply with AWS D1.1/D1.1M[ and AWS D1.8/D1.8M] for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

### 3.10 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  1. Clean and prepare surfaces by SSPC-SP 3, Power Tool Cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 9."
- D. After erection, all damaged areas in shop coat, exposed surfaces of bolt heads, nuts and washers, and all field welds and unpainted areas adjacent to field welds and high strength bolts shall be painted with a "touch-up" application of same paint used in the shop coat and then painted with same paint used for shop coat tinted another color. Retouch in field, any scraped, abraded, and unpainted surfaces. Painting shall be as specified for shop coats.
- E. Structural steel which is to support mechanical equipment and will be left exposed to the weather in the finished project shall be field painted with one coat of anti-corrosive paint as described in Part 2 for Paint Materials, unless otherwise noted.

### 3.11 WASTE MANAGEMENT

- A. Separate and recycle waste materials to the maximum extent feasible.
- B. Separate for recycling and place in designated containers the following metal waste in accordance with the Waste Management Plans and local recycler standards: Steel, iron, galvanized steel, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze.
- C. Collect all metal cut-offs and scraps and recycle as above.
- D. Fold up metal banding, flatten and place in designated area.
- E. Close and seal tightly all partly used paint and finish containers and store protected in a well-ventilated, fire-safe area at moderate temperature.
- F. Designated un-used paint for:
  1. Immediate re-use
  2. Long term maintenance needs
  3. Recycling by an appropriate facility.
  4. Donation

- G. Place empty containers of solvent-based paints in areas designated for hazardous materials.
- H. Do not dispose of paints or solvents by pouring on the ground. Place amounts too small to re-use in designated containers for proper disposal
- I. Place materials defined as hazardous or toxic waste in designated containers.

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SECTION 05 31 00  
STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to the work of this Section.

1.2 SUMMARY

- A. Section includes but is not limited to the following as shown on the drawings and as specified herein:

1. Floor deck
2. Roof deck
3. Headed shear studs
4. All necessary deck supports and reinforcing other than principal framing members including diagonals at columns, angles, plates, and etc.
5. Flashing, cell closures, closure plates and sheet metal work required to contain concrete.
6. Ceiling hanger tabs at new decking composite with concrete where new suspended ceilings are required.
7. Waste Management.

- B. Related Requirements:

1. Concrete and reinforcement over decking
2. Structural steel
3. Shoring of metal deck where unsupported span exceeds the allowable
4. Ceiling systems
5. Mechanical and electrical where supported from deck
6. Fireproofing systems
7. Sheet metal work
8. Waste Management/Recycling Strategies

1.3 PERFORMANCE REQUIREMENTS

- A. Metal deck unit sizes and gages are indicated on the drawings. Gages indicated on the drawings are a minimum. Thickness of deck may be required to be increased by deck manufacturer for loadings indicated on drawings.
- B. Unit shall span over three or more supports except where steel layout does not permit.
- C. Maximum allowable deflection under live load plus super imposed dead load shall not exceed (1/360) of the span or (1/4) inch whichever is less.
- D. Deck shall be sized as unshored. Shoring of deck is not permitted unless specifically shown in areas on the drawings.
- E. Use of piercing, non-piercing, and integral hanger tabs is not permitted at roof deck.
- F. Units included in a fire rated assembly must be classified in appropriate UL design.

#### 1.4 SUBMITTALS

- A. Product Data: Product data, including manufacturer's specifications, load tables, section properties and installation instructions for each type of decking and accessories.
- B. Shop Drawings: Shop drawings for all installations showing gauges, deck layout, type of deck, any shoring required, where located, welding details necessary for fabrication to fit in place, and all accessories. Do not use reproductions of the Design Drawings. In addition include the following:
  - 1. Ceiling tab, fillers, closures and similar items.
  - 2. Show placement of headed shear studs connectors with respect to the flutes of the metal deck. Variation from the specified deck configuration may result in a decrease of the capacity of the studs, requiring more studs.
- C. Product Certificates: Certification of specification compliance for each item specified.
- D. Shop drawings showing exact placement of all headed shear studs connectors with respect to the flutes of the metal deck. Variation from the specified deck configuration may result in a decrease of the capacity of the studs, requiring more studs.
- E. Reports
  - 1. Submit certification of recycled steel content. Certification shall clearly indicate post-consumer AND post-industrial recycled steel content for the particular member or members used.
  - 2. Submit mill and fabricator certification if in compliance with ISO14001.
  - 3. Submit verification of finishing process:
    - a. Provide a cut sheet and a Material Safety Data Sheet (MSDS) for all shop and field paints used highlighting VOC limits and chemical and mineral component limits.
    - b. For heavy metals in used plating processes: Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each plating material and related compounds highlighting chemical component limits.
    - c. Certification of recycled zinc content for galvanized products: Provide cut sheets clearly indicating whether the galvanized products used meet the minimums for post-consumer OR post-industrial recycled contents. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and if the recycled content is post-consumer or post-industrial.
  - 4. Submit verification of biodegradable or low VOC, and low Hazardous Air Pollutants (HAPS) cleaning solutions. Provide a cut sheet and a Material Safety Data Sheet (MSDS) for all cleaning solutions used in the surface preparation of steel components. Highlight VOC limits and chemical component limits.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
  - 1. Power-actuated mechanical fasteners.
- G. Evaluation Reports: For steel deck.

#### 1.5 QUALITY ASSURANCE

- A. Except as modified by governing codes and by this specification, comply with the applicable provisions and recommendations of the following codes and standards:
  - 1. New York City Building Code, Latest Edition
  - 2. American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed

- Steel Structural Members".
3. American Welding Society (AWS), D1.1 "Structural Welding Code" and D1.3 "Structural Welding Code-Sheet Steel".
  4. Steel Deck Institute (SDI) "Design Manual for Composite Decks, Form Decks, and Roof Decks".
- B. Fabricator Qualifications: The work under this section shall be performed by a fabricator and erector submitting conclusive evidence of having satisfactorily completed work of similar scope and of having the necessary skill, equipment, facilities and capacities to fabricate and perform the erection in accordance with the construction schedules and in full compliance with all requirements of the Contract Documents.
- 1.6 DELIVERY, STORAGE AND HANDLING
- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work. However, efforts should be made to minimize the disturbance to site and soil conditions for example, by not requiring excessive areas to be put aside for on-site storage.
  - B. Store materials to permit easy access for inspection and identification. Keep all materials in a safe, dry, off ground location, using pallets, platforms, or other supports. Protect all materials from corrosion and deterioration, discoloration or staining. Make efforts to minimize any waste and ensure that as much waste as possible is recycled.
  - C. Do not store materials on structure in a manner that might cause distortion or damage to members of supporting structures. Repair or replace damaged materials or structures as directed.
- 1.7 PROJECT CONDITIONS
- A. Examine all work prepared by others to receive work of this section and report any defects affecting installation to the contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by others.
  - B. If the supporting beams are not properly aligned or sufficiently level to permit proper bearing of the steel decking units, the steel decking contractor shall bring the matter to the attention of the contractor for corrective action. The steel decking units are not to be placed until the necessary correlations are made.
  - C. Installation of the deck and shear studs will be inspected by the Commissioner's agent.

## PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS
- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- 2.2 MANUFACTURERS
- A. Supply manufactured deck units in accordance with the applicable requirements of the Steel Deck Institute's "Design Manual for Floor Decks and Roof Decks".
  - B. Deck shall be manufactured by one of the following (or other equivalent as approved by the Commissioner and Architect/Engineer of record):
    1. Wheeling Corrugating Co
    2. United Steel Deck (manufactured by Canam)

### 3. Vulcraft

#### 2.3 DECK MATERIALS

- A. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated on the drawings. Contractor shall provide heavier gauge if the minimum gauge indicated is not sufficient to support construction loads as unshored forms and/or total load as indicated on the drawings based on the composite section. Deck shall have deformations specifically designed to produce composite action between the deck and the concrete slab by mechanical bond.
1. Formed from galvanic steel sheets conforming to ASTM A653. Size of deck is to follow SDI requirements for thickness and tolerances.
  2. Minimum yield strength of 33,000 psi.
  3. Formed with integral locking lugs.
  4. Formed with deformations to provide bond with concrete.
  5. Deck to receive sprayed fireproofing shall be free of lubricants or oils that would impair the adhesion of the fireproofing material.
  6. Metal deck that is not exposed to view with architectural paint finish shall have integral hanger tabs providing an approximate 0.5% uniformly distributed open area. The hanger tabs are used for venting purposes only.
- B. Non-composite Form Deck: Fabricate ribbed-steel sheet non-composite form-deck panels to comply with "SDI Specifications and Commentary for Non-composite Steel Form Deck," in SDI Publication No. 31, with the minimum section properties indicated on the drawings. Contractor shall provide heavier gauge if minimum gauge indicated is not adequate to support total loads as shown on the drawings.

#### 2.4 ACCESSORIES

- A. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- B. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- C. Anchor clips, vent clips, welding washers, flashing, saddle plates, sump pans, other accessories shall be those types, sizes, and configurations recommended by the decking manufacturer, and shall be of the same material and finish as the deck units. All accessories shall conform to ASTM A653/A63M.
- D. Cell closure flexible strips, and fillers shall be of material in compliance with applicable building code governing class of construction.
- E. Provide metal closure strips at edges of all slabs and openings that serve as pour stops for concrete. Gauge shall be sufficient to span or cantilever from steel beams.
- F. Roof sump pans: Fabricate from a single piece of galvanized sheet steel of the same quality as the deck units; not less than nominal 0.0747" (14 gauge) thick before galvanizing; with bottoms level after erection and sloping sides to direct water flow to the drain, unless otherwise shown.

Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1-1/2" below the roof deck surface, unless otherwise shown or required by deck configuration. Weld to deck at maximum 12" o.c.

- G. Headed studs for shear connectors shall be per drawings manufactured from cold drawn wire and conforming to ASTM A 108, Grades 1010 thru 1020.

1. Subject to compliance with requirements, studs shall be manufactured by one of the following:

- a. Nelson
- b. KSM

## 2.5 FABRICATION

- A. Fabricate deck units in accordance with the AISI's "Specification for the Design of Cold-Formed Steel Structural Members" and accepted shop drawings. Fabricate deck units to the sizes and configurations indicated and cut to lengths which will span not fewer than three supporting members; use only full length units at overhang where indicated in a manner that laps fit tightly. Locate openings for penetrations where indicated and provide support framing and edge reinforcement for all openings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSPECTION

- A. Inspection of the metal deck and shear stud installation will be performed by an inspection agency retained by the Commissioner at no expense to the contractor. The inspection agency shall work under the direction of the Commissioner. Contractor shall provide the inspection agency with the following:
  - 1. Schedule of all work in both shop and field with at least ten days written notice before commencement of either activity.
  - 2. A complete set of approved shop and erection drawings.

### 3.3 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section. Erection shall closely follow the erection of structural steel.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members as per load schedule provided on contract documents.
- D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- E. Provide additional reinforcement and closure pieces at openings as required for strength, conti-

- F. nuity of deck, and support of other work, per drawings and manufacturer's specifications and . Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- G. Headed shear studs shall be installed by welding through metal deck onto beam below. Automatic welding machinery of approved design, amperage, duration of current, etc., shall be used. Studs shall be tested by testing laboratory in accordance with AWS Procedures for Bend Test; replace all studs which do not pass test.
- H. All welding shall be performed by competent experienced welding mechanics. All welds shall be given a protective coat of paint as specified in painting article of section 051200.
- I. All abraded or damaged protective surfaces of steel decking work shall be touched up with a protective coat of paint by this contractor as erected.

### 3.4 FLOOR DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members per the drawings. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports per the drawings.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing per manufacturer's specification but not less than 1-1/2 inches, with end joints as follows:
  - 1. End Joints: Lapped 2" minimum or butted at Contractor's option.
- D. All unframed deck openings in composite deck with concrete larger than 6" shall be reinforced per the drawings.
- E. At composite deck with concrete, metal hanger tabs shall be installed at all panel sidelaps 24 inches o.c., longitudinally 24 inches o.c. to create a grid nominally 24 inches by 24 inches. Tabs shall be 18 gauge minimum, capable of supporting the specified ceiling, tabs shall be a minimum of 18 gauge capable of supporting ceiling and all other suspended loads or 200 pounds, whichever is greater.
- F. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- G. Sealing cellular deck openings, butt joints, and junctions with trench headers with tape is not included in this Section. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.
- H. The steel decking units shall be placed on the supporting steel framework and adjusted to final position before being permanently fastened. Each unit shall be brought to proper bearing on the supporting beams.
- I. Deck shall, where possible, span 3 or more supports.
- J. The side laps of adjacent units shall be fastened by approved method (to be shown on shop drawings) between supports at intervals as noted on the drawings.
- K. All welding shall be performed by competent experienced welding mechanics. All welds, shall be given a protective coat of paint as specified in painting article of section 05100.
- L. All abraded or damaged protective surfaces of steel decking work shall be touched up with a protective coat of paint by this contractor as erected.
- M. Headed shear studs shall be installed by welding through metal deck onto beam below. Automatic welding machinery of approved design, amperage, duration of current, etc., shall be used. Studs shall be tested by testing laboratory in accordance with AWS Procedures for Bend Test; replace all studs which do not pass test.
- N. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspection as required by the applicable Building Code of all metal decking will be performed by an inspection agency retained by the Commissioner at no expense to the Contractor. The inspection agency shall work under the direction of the Commissioner. Contractor shall provide the inspection agency with the following:
1. Schedule of all work in field with at least ten days' written notice before commencement of either activity.
  2. A complete set of approved shop and erection drawings.
  3. Order sheets, material bills, shipping bills and mill test reports.
  4. Representative sample pieces as requested by the testing agency.
  5. Full and ample means and assistance for testing all material.
  6. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and field.
- B. Each person installing connections shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the inspector can refer back to the person making the connection.
- C. The following minimum criteria shall be adhered to in testing of welds:
1. All welds shall be examined by visual means.
  2. 25% of all welds, selected randomly, shall be measured.
  3. In addition, all welds subject to tensile stress shall be examined by the Ultrasonic Method for 100% of their length.
  4. 10% of all manual fillet welds shall be tested by the magnetic particle method.
  5. 1'-0" at each end of automatic fillet welds shall be tested by the magnetic particle method.
  6. 100% of groove welds shall be tested by the ultrasonic method.
- D. Field inspection will include examination of decking for welding and touching-up of shop coat.
- E. Inspection of welding will be such as to assure that the work is within the quality requirements specified below and elsewhere in this section of the specifications and will include:
1. Ascertainment that the electrodes and flux used for the SAW, GMAW and FCAW welding processes conform to the requirements of this section of the specifications.
  2. Ascertainment that the approved welding procedures and sequence are followed without deviation, unless specific approval for change is obtained from the Commissioner.
  3. The testing agency shall be prepared to utilize the following approved methods of testing:
    - a. Liquid penetrant inspection: ASTM E 165.
    - b. Magnetic particle: ASTM A 709.
    - c. Radiographic inspection: ASTM E 94 and E 1032.
    - d. Ultrasonic inspection: ASTM E 114 and AWS, Chapter 6, Section C.
- F. When defects are revealed, additional inspection by whatever method is deemed necessary by the inspector, shall be performed to the extent necessary to assure that the full amount of defect has been located. No further work shall be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects shall be repaired, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Commissioner. Inspection of the repaired weld shall be by the same method that was used to reveal the defect. A second repair of a defective area shall not be made without approval of the Commissioner.
- G. A distinguishing mark will be placed on all work that has been inspected and approved. Material or work that is not acceptable will be designated by words such as "REJECT" or "REPAIR"

- marked directly on the material or work.
- H. Testing agency will report inspection results promptly and in writing to Contractor and Commissioner.
- I. Remove and replace work that does not comply with specified requirements.
- J. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

### 3.6 CLEANING UP

- A. Remove all equipment, unused materials and debris from the site immediately upon the completion of this work.

### 3.7 WASTE MANAGEMENT

- A. Separate and recycle waste materials to the maximum extent feasible.
- B. Separate for recycling and place in designated containers the following metal waste in accordance with the Waste Management Plans and local recycler standards: Steel, iron, galvanized steel, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze.
- C. Collect all metal cut-offs and scraps and recycle as above.
- D. Fold up metal banding, flatten and place in designated area.
- E. Close and seal tightly all partly used paint and finish containers and store protected in a well-ventilated, fire-safe area at moderate temperature.
- F. Designated un-used paint for:
  - 1. Immediate re-use
  - 2. Long term maintenance needs
  - 3. Recycling by an appropriate facility.
  - 4. Donation
- G. Place empty containers of solvent-based paints in areas designated for hazardous materials.
- H. Do not dispose of paints or solvents by pouring on the ground. Place amounts too small to re-use in designated containers for proper disposal
- I. Place materials defined as hazardous or toxic waste in designated containers.

END OF SECTION

## SECTION 055000

### MISCELLANEOUS METALS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the miscellaneous metal work as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  1. Rough hardware.
  2. Vertical steel ladders.
  3. Steel pipe handrails and railings not part of steel pan stair assemblies.
  4. Loose steel lintels.
  5. Light steel framing and supports, not included as part of work of other trades.
  6. Special Trims.
  7. Handrails.
  8. Double steel beam at stair.
  9. Duct supports (3/A600) and dunnage support (1/A600) on roof.
  10. Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of work of this Section.
  11. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
  12. Cutting, fitting, drilling and tapping work of this Section to accommodate work of other Sections and of concrete, masonry or other materials as required for attaching and installing work of this Section.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.

- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Structural steel - Section 051200.
- F. Steel pan stairs - Section 055100.
- G. Painting - Section 099000.

#### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- D. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- E. Reference Standards: The work is subject to requirements of applicable portions of the following standards:

1. "Manual of Steel Construction," American Institute of Steel Construction.
  2. AWS D1-1 "Structural Welding Code," American Welding Society.
  3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning," Steel Structures Painting Council.
  4. SSPC PA-1 "Painting Application Specification," Steel Structures Painting Council.
  5. "Handbook on Bolt, Nut and Rivet Standards," Industrial Fasteners Institute.
- F. Steel Materials: For steel to be hot dip-galvanized, provide steel chemically suitable for metal coatings complying with the following requirements: carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.
- G. Engage the services of a galvanizer who has demonstrated a minimum of five (5) years' experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and coatings within the same facility as outlined herein. The Commissioner has the right to inspect and approve or reject the galvanizer/galvanizing facility.
- H. The galvanizer/galvanizing facility must have an ongoing Quality Control/Quality Assurance program which has been in effect for a minimum of five years and shall provide the Commissioner with process and final inspection documentation. The galvanizer/galvanizing facility must have an on-premise testing facility capable of measuring the chemical and metallurgical composition of the galvanizing bath and pickling tanks.
- I. Inspection and testing of hot-dip galvanized coating shall be done under the guidelines provided in the American Hot-Dip Galvanizers Association (AGA) publication "Inspection of Products Hot-Dip Galvanized After Fabrication."

#### 1.5 PERFORMANCE STANDARDS

- A. Railings shall be constructed to conform to the following performance standards:
1. Railings shall be designed to resist loads per 2008 NYC Building Code.

#### 1.6 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.

- b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  - 2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  - 3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  - 4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Manufacturer's Literature: Submit manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products.
  - C. Shop Drawings: Shop drawings for the fabrication and erection of all assemblies of miscellaneous iron work which are not completely shown by manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items.
  - D. Engineering Data
    - 1. Before any railings are fabricated, submit engineering data drawings to the Commissioner for review indicating how performance standards specified here shall be met. The Contractor is responsible for the structural design and supports for these systems and must show his proposed systems on these drawings.
    - 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of New York and shall be signed and sealed by this Engineer.
  - E. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown to clarify all welding. Notes such as 1/4" weld, weld and tack weld are not acceptable.
  - F. Certification: For items to be hot-dip galvanized, identify each item galvanized and to show compliance of application. The Certificate shall be signed by the galvanizer and

shall contain a detailed description of the material processed and the ASTM standard used for the coating and, the weight of the coating. In addition, and as attachment to Certification, submit reports of testing and inspections indicating compliance with the provisions of this Section.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### A. Metals

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
2. Steel Plates, Shapes and Bars: ASTM A 36.
3. Steel Bar Grating: ASTM A 1011/A or ASTM A 36.
4. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
5. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.
6. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.
7. Steel Pipe: ASTM A 53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.
8. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
10. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
11. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

B. Grout: Non-shrink, non-metallic grout conforming to the requirements of Section 033000.

#### C. Fasteners

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
  3. Anchor Bolts: ASTM F 1554, Grade 36.
  4. Lag Bolts: ASME B18.2.1.
  5. Machine Screws: ASME B18.6.3.
  6. Plain Washers: Round, carbon steel, ASME B18.22.1.
  7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
  8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
  9. Lock Washers: Helical spring type carbon steel, ASME B18.21.1.
- D. Shop Paint: Shop prime all non-galvanized miscellaneous metal items using Series 88 Azeron Primer made by Tnemec, ICI Devoe "Rust Guard" quick dry alkyd shop coat No. 41403, or "Interlac 393" by International Protection Coatings.
1. If steel is to receive high performance coating as noted in Section 099000, shop prime using primer noted in Section 099000.
- E. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.
- F. Galvanize Repair Coating: For touching up galvanized surfaces after erection, provide repair coating that is V.O.C. compliant, equal to "Silver Galv" made by Z.R.C. Worldwide or approved equal. Apply to a dry film thickness of 1.5 to 3.0 mils.

## 2.2 PRIME PAINTING

- A. Scope: All ferrous metal (except galvanized steel) shall be cleaned and shop painted with one coat of specified ferrous metal primer. No shop prime paint required on galvanized steel or aluminum work.
- B. Cleaning: Conform to Steel Structures Painting Council Surface Preparation Specification SP 3 (latest edition) "Power Tool Cleaning" for cleaning of ferrous metals which are to receive shop prime coat.
1. Steel to get high performance coating as noted in Section 099000 shall be cleaned as per SSPC SP.6 "Commercial Blast Cleaning."
- C. Application
1. Apply shop prime coat immediately after cleaning metal. Apply paint in dry weather or under cover. Metal surfaces shall be free from frost or moisture when painted. Paint all metal surfaces including edges, joints, holes, corners, etc.
  2. Paint surfaces which will be concealed after shop assembly prior to such assembly. Apply paint in accordance with approved paint manufacturer's printed instructions, and the use of any thinners, adulterants or admixtures shall be only as stated in said instructions.

3. Paint shall uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work shall be shipped until the shop prime coat thereon has dried.
- D. Touch-Up: In the shop, after assembly and in the field, after installation of work of this Section, touch-up damaged or abraded portions of shop prime paint with specified ferrous metal primer.
- E. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

### 2.3 GALVANIZING

- A. Scope: All ferrous metal exposed to the weather, and all ferrous metals indicated on drawings or in specifications to be galvanized, shall be cleaned and then hot-dipped galvanized after fabrication as provided by Duncan Galvanizing or approved equal.
- B. Avoid fabrication techniques that could cause distortion or embrittlement of steel items to be hot-dip galvanized. Fabricator shall consult with hot-dip galvanizer regarding potential warpage problems or handling problems during the galvanizing process that may require adjustment of fabrication techniques or design before finalizing shop drawings and beginning of fabrication.
- C. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust, dirt, grease, oil, moisture and other contaminants prior to galvanizing.
- D. Application: Hot-dip galvanizing shall conform to the following:
  1. ASTM A 143: Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel.
  2. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  3. ASTM A 153: Galvanized Coating on Iron and Steel Hardware - Table 1.
  4. ASTM A 384: Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
  5. ASTM A 385: Practice for Providing High Quality Zinc Coatings.
  6. ASTM A 924: Galvanized Coating on Steel Sheets.
  7. Minimum weight of galvanized coating shall be two (2) oz. per square foot of surface.
- E. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

- F. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.
- G. To minimize surface imperfection (eg: flux inclusions), material to be galvanized shall be dipped into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.
- H. After galvanizing all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.
- I. Galvanized surfaces, where exposed to view, must have a smooth, level surface finish. Where this does not occur, piece shall be rejected and replaced to the acceptance of the Commissioner.

## 2.4 PROTECTIVE COATINGS

- A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which shall be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

## 2.5 WORKMANSHIP

- A. General
  - 1. Miscellaneous metal work shall be fabricated by an experienced fabricator or manufacturer and installed by an experienced tradesman.
  - 2. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings and specifications, approved shop drawings, and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected.
  - 3. All work shall be accurately and neatly fabricated, assembled and erected.
- B. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Shop assemble work in largest practical sizes to minimize field work. It is the responsibility of the miscellaneous metal subcontractor to assure himself that the shop-fabricated miscellaneous metal items will properly fit the field condition. In the event that shop-fabricated miscellaneous metal items do not fit the field condition, the item shall be returned to the shop for correction.
- C. Cutting: Cut metal by sawing, shearing, or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp and free of burrs, without deforming adjacent surfaces or metals.
- D. Holes: Drill or cleanly punch holes; do not burn.

E. Connections: Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to weather. Locate joints where least conspicuous. Unless indicated otherwise, weld or bolt shop connections; bolt or screw field connections. Provide expansion and contraction joints to allow for thermal movement of metal at locations and by methods approved by Commissioner.

1. Welding

- a. Shall be in accordance with "Standard Code for Welding in Building Construction" of the American Welding Society, and shall be done with electrodes and/or methods recommended by the manufacturer of the metals being welded.
- b. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces; undercut metal edges where welds are required to be flush.
- c. All welds on or behind surfaces which will be exposed to view shall be done so as to prevent distortion of finished surface. Remove weld spatter and welding oxides from all welded surfaces.

2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads exposed to view shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts or adjacent metal.

F. Operating Mechanism: Operating devices (i.e. pivots, hinges, etc.) mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.

G. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items specified under this Section of the Specifications to be built into concrete, masonry or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.

H. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.

I. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.

J. Exposed Work

1. In addition to requirements specified herein and shown on drawings, all surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs, and other defects which mar appearance of finished work.

2. Metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design.
  3. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.
- K. Preparation for Hot-Dip Galvanizing: Fabricator shall correctly prepare assemblies for galvanizing in consultation with galvanizer and in accordance with applicable Reference Standards and applicable AGA publications for the "Design of Products to be Hot-Dip galvanized After Fabrication." Preparation shall include but not be limited to the following:
1. Remove welding flux.
  2. Drill appropriate vent holes and provide for drainage in inconspicuous locations of hollow sections and semi-enclosed elements. After galvanizing, plug vent holes with shaped lead and grind smooth.

## 2.6 MISCELLANEOUS METALS ITEMS

### A. Rough Hardware

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood connections; elsewhere, furnish steel washers.

### B. Ladders

1. Vertical steel ladders shall be eighteen (18) inches wide with 3/4" diameter non-slip steel rungs spaced twelve (12) inches o.c. Stringers shall be 3/8" thick by 2-1/2" wide steel bars; rungs welded to bars. Attach ladders to walls six (6) inches from top and bottom and maximum thirty-six (36) inches o.c. from these points. At the roof, gooseneck the rails back to the structure to provide secure ladder access.
2. Ladders shall be fabricated to support a live load of one hundred (100) lbs. per square foot and a concentrated load of three hundred (300) lbs. per rung; loads not to act simultaneously.
3. Elevator pit ladder shall conform to the requirements listed in the elevator specification section.

### C. Steel Pipe Handrails

1. Steel pipe of size shown on Drawings, Schedule 40. Fittings shall be flush type, malleable or cast iron. Brackets shall be malleable iron, design as selected by the Commissioner.
2. Construction: Form direction changes in rails using solid bar stock or elbows. Connections shall be shop welded and ground smooth and flush, except where field connections and expansion joints are required. Field connections may be welded, internal sleeve and plug weld, or internal sleeve and set screw.
3. Secure handrails to walls with wall brackets. Provide brackets of malleable iron castings, with not more than three (3) inches clearance from inside face of handrail to wall surface. Neatly drill wall plate portion of the bracket into concrete or masonry to receive bolts for concealed anchorage. For installation at drywall, Drywall trades shall provide plate to receive wall plate portion of bracket and anchor or bolt wall plate through drywall to supporting steel plate. Locate brackets at not more than 5'-0" o.c. unless otherwise shown.
4. Provide wall return fittings of cast iron, flush type, with the same projection as that specified for wall brackets.
5. Longitudinal members shall be parallel with each other and with floor surface or shape of stair to a tolerance of 1/8" in 10'-0" linear feet. Center line of members within each run of railing shall be in the plane.
6. For steel pipe posts where indicated, anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized steel pipe, not less than six (6) inches long and having an inside diameter not less than 1/2" greater than outside diameter of the inserted pipe. Provide steel plate closure secure to bottom of sleeve and of width and length not less than one (1) inch greater than outside diameter of sleeve. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-ferrous grout. Cover anchorage joint with a round steel flange welded to post. Posts shall be set plumb within 1/8" vertical tolerance.
7. Steel pipe handrails shall be capable of resisting a two hundred (200) lb. force applied to rail from any direction and a uniformly distributed load of fifty (50) lbs. per linear foot applied downward or horizontally, loads not to act simultaneously.

### D. Loose Steel Lintels

1. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than eight (8) inches bearing at each side of openings, unless otherwise indicated.
2. Loose lintels shall conform to the following Schedule:

Opening Width (Maximum)	WALL THICKNESS		
	4 inches	6 inches	8 inches*
2'-0"	3-1/2" x 3-1/2" x 1/4"	6" x 4" x 5/16"	3-1/2" x 3-1/2" x 1/4"
3'-0"	3-1/2" x 3-1/2" x 5/16"	6" x 4" x 5/16"	3-1/2" x 3-1/2" x 5/16"
4'-0"	3-1/2" x 3-1/2" x 5/16"	6" x 4" x 5/16"	3-1/2" x 3-1/2" x 5/16"
5'-0"	4" x 3-1/2" x 3/8"	6" x 4" x 3/8"	4" x 3-1/2" x 5/16"
6'-0"	5" x 3-1/2" x 3/8"	6" x 4" x 3/8"	5" x 3-1/2" x 5/16"
7'-0"	5" x 3-1/2" x 3/8"	5" x 5" x 1/2"	5" x 3-1/2" x 3/8"
8'-0"	5" x 3-1/2" x 3/8"	5" x 5" x 5/8"	5" x 3-1/2" x 3/8"

\* Two angles at all openings in eight (8) inch walls.

3. At columns or vertical surfaces where lintels cannot bear on masonry, provide clip angles sized for structural capacity of lintel.

E. Miscellaneous Light Steel Framing

1. Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., shall be of such shapes and sizes as indicated on the drawings and details or as required to suit the condition and shall be provided with all necessary supports and reinforcing such as hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly support and rigidly fasten and anchor same in place and to steel, concrete, masonry and all other connecting and adjoining work.
2. All light steel framing steel shall be furnished and erected in accordance with the applicable requirements of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction and as specified herein.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where miscellaneous metal is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 ERECTION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.
- C. Fitting Connections: Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance, and quality of welds made, and methods used in correcting welding work.
- E. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- F. Field Touch-Up of Galvanized Surfaces: Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified herein for galvanized surfaces.

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## SECTION 055800

### PERIMETER HEATING/COOLING ENCLOSURES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Custom perimeter heating/cooling enclosures required for this work are indicated on the drawings.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Gypsum drywall - Section 092900.
- F. Field painting - Section 099000.
- G. Heating elements - Division 23.
- H. Telephone and electrical outlet boxes - Division 26.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:

1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Verify dimensions by field measurement before fabrication, where possible, without delaying the project. Design units to provide for adjustment and fitting of components during field installation.
- D. Preassemble units at the shop to the greatest extent possible to minimize mechanical joints, splicing and field assembly of units.
- E. Special Experience Requirements
1. Installer: The contractor or subcontractor performing the work of this Section must, within the last three (3) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.

3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Shop Drawings: Before any of the materials of this Section are delivered to the job site, submit complete Shop Drawings to the Commissioner. Shop Drawings shall include plans, elevations and detail sections. Show jointing, anchorage and accessory items, and specify finishes.

#### 1.6 FULL SIZE MOCK-UPS

- A. Provide a full scale mock-up of each type of enclosure, installed at a building location as selected by the Commissioner for approval before manufacture of the enclosures has begun. Mock-ups shall include typical end and corner conditions. Each mock-up shall be a min. length of 2 typical sections.
- B. Rework mock-ups until approved by Commissioner. Installed work shall match approved mock-ups.
- C. Approved mock-ups may remain as part of the finished building construction.
- D. Provide an additional mock-up at a remote location associated with the building envelope testing.

#### 1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Commissioner and at no additional cost to the City of New York.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. General: Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Exposed to view surfaces which exhibit pitting, seam marks, roller marks, "oil

canning", stains, discolorations or other imperfections on the finished units are not acceptable.

- B. Aluminum Plate and Sheet: ASTM B 209M, Alloy 3003-H14 or Alloy 5005-H32.
- C. Cold Rolled Sheet Steel: ASTM A 1008 commercial steel sheet.
- D. Fasteners: Provide concealed fasteners, Type 304 stainless steel unless otherwise indicated. Use Phillips flathead machine screws where exposed, unless otherwise indicated.
- E. Anchors: Use non-ferrous metal or hot-dip galvanized anchorages on exterior walls. Provide toothed steel or lead shield expansion bolt devices for drilled-in-place anchors.
- F. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
  - 1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.2 FABRICATION

- A. Fabricate decorative grilles from perforated aluminum sheet or plate of thickness, size, and pattern indicated. Form perforations by punching, cutting, or drilling to produce openings of sizes and shapes indicated. Roll, press, and grind perforated metal to flatten and to remove burrs and deformations.
- B. Fabricate units to support a min. loading of 200 lbs. per sq. ft. or 150 lbs. per lin. ft (whichever is greater) without permanent deflection. Provide stiffeners or laminated backing as required for strength and rigidity. Include brackets, plates and straps in the assemblies for support and anchorage to other work.
- C. Form enclosures to the profiles, sizes and shapes shown. Form sheet metal sections to provide flush meeting edges without metal-to-metal laps at joints or exposed metal edges, unless otherwise shown. Joints shall be hairline butt joints as few as possible in number and occurring on the building module.
- D. Fabricate removable panels in enclosures to a fitting tolerance of not less than 1/32" and not more than 1/16" at each edge.
- E. Provide removable panels for access to enclosed heating elements. Locate fixed sections to occur only at window mullions and at ends of runs, unless otherwise shown.
- F. Miters and copes shall be tight fitting, square and in true alignment. Close exposed corners and seams by forming procedures or by welding, brazing or soldering and grinding smooth and flush on exposed surfaces. Comply with the recommendations of AWS and NAAMM for welding, brazing and soldering.

- G. Provide sound-deadening for concealed faces of metal panels over 6" wide, consisting of a heavy bituminous coating applied at the min. rate of 20 sq. ft. per gal. Apply sound-deadening coating after completion of shop finishing.
- H. Coordinate and provide clip for fin tube hanger at each enclosure mullion.

### 2.3 SHOP FINISHING

- A. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP-8, "Pickling."
- B. Pretreatment: Immediately after cleaning, apply a conversion coating of type suited to organic coating applied over it.
- C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 0.04 mm. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
  - 1. Color and Gloss: As indicated or as selected by Commissioner from manufacturer's full range.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where perimeter heating/cooling enclosures are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION, GENERAL

- A. Set unit enclosures in location and alignment, plumb and level with adjacent work.
- B. Anchor securely in the manner shown, using concealed anchorages wherever possible.
- C. Form tight joints with exposed connections accurately fit together.
- D. Repair enclosures damaged by cutting, welding, soldering and grinding operations required for fitting and jointing.
- E. Restore prime coats of paint so that there is no evidence of corrective work.

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## SECTION 057000

### ORNAMENTAL METALS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ornamental metals, including heavy gauge stainless steel and non-ferrous metal products which are used in building construction for functional, architectural, and decorative effects, and which are not a part of other metal systems specified in other Sections. The extent of these items is indicated on the drawings and/or specified herein, including, but not limited to, the following:

1. Aluminum gates.
2. Aluminum wall base.
3. Powdercoated steel partition at gate to cellar stair.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Miscellaneous metals - Section 055000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. General: Work of this section shall be fabricated and installed by an experienced fabricator or manufacturer who has been engaged in work of equivalent scope and fabrication standards for at least three (3) years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled, and erected.
- D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. However, do not delay job progress; allow for adjustments and fitting where taking of field measurements before fabrication might delay the work.
- E. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Work that cannot be permanently shop assembled, shall be completely assembled, marked and disassembled in shop before shipment to insure proper assembly in field. Shop assemble work in largest practical sizes to minimize field work. It is the responsibility of the Contractor for this work to assure himself that the shop fabricated items will properly fit the field condition. In the event that shop fabricated items do not fit the field condition, the item shall be returned to the shop for correction.
- F. Special Experience Requirements
1. Installer: The contractor or subcontractor performing the work of this Section must, within the last three (3) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

## 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Shop Drawings: Submit for all items of work of this Section, as enumerated under paragraph 1.2, showing locations, layouts, materials, thicknesses, finishes, dimensions, construction, relation to adjoining construction, erection details, profiles, jointing and all other details to fully illustrate the work of this Section.
- C. Samples: Submit fabricated samples (of sufficient size to fully show construction, materials and finishes) of all items of work as enumerated under paragraph 1.2 herein.
- D. Product Data: Submit manufacturer's, fabricator's and finisher's specifications and installation instructions for products used in ornamental metal work, including finishing materials and methods.

## 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.

- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the City of New York.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Exposed to view surfaces which exhibit pitting, seam marks, roller marks, "oil-canning," stains, discolorations, or other imperfections on the finished units will not be acceptable.
- B. Aluminum: Comply with the following standards for the forms and types of aluminum for the required items of work.
  - 1. Alloy and Temper: Provide alloy and temper as indicated or as otherwise recommended by the aluminum producer or finisher.
  - 2. Aluminum Extrusions, Bars and Shapes: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T6.
  - 3. Extruded Pipe and Tube: ASTM B 429, alloy 6063-T6.
  - 4. Aluminum Plate and Sheet: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209, alloy 6061-T6.
  - 5. Bars, Rods and Wire: ASTM B 211.
  - 6. Drawn Seamless Tube: ASTM B 483, alloy 6063-T832.
  - 7. Castings: ASTM B 26; alloy A356-T6.
  - 8. Forgings: ASTM B 247, alloy 6061-T6.
- C. Steel
  - 1. Structural Shapes: ASTM A 36.
  - 2. Plates (for forming or bending cold): ASTM A 283, Grade C.
  - 3. Steel Sheets: ASTM A 366, Grade 1.
  - 4. Powder coated finish.
- D. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.

- E. Fasteners: Furnish basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Provide Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- F. Anchors and Inserts: Either furnish inserts to be set in concrete or masonry work, or provide other anchoring devices as required for the installation of ornamental metal items. Provide toothed steel or lead shield expansion bolt devices for drilled-in-place anchors. Provide galvanized or cadmium-coated anchors and inserts for exterior installations.
  - 1. Provide units with exposed surfaces matching the texture and finish of the metal item anchored.
- G. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).
- H. Cast-in-Place and Preinstalled Anchors: Anchors fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete.

## 2.2 FABRICATION

- A. Cutting: Cut metal by sawing, shearing or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp, square and free of burrs, without deforming adjacent surfaces or metals.
- B. Holes: Drill or cleanly punch holes (do not burn), so that holes will be accurate, clean, neat and sharp without deforming adjacent surfaces or metals.
- C. Connections
  - 1. Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to water. Locate joints where indicated on drawings. Provide connections to allow for thermal movement of metal at locations and by methods approved by Commissioner. For work exposed to view, use concealed fasteners (unless welded or other connections indicated) with joints accurately fitted, flush and rigidly secured with hairline contacts.
  - 2. Welding: Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces so that joint will not be visible; undercut metal edges where welds are required to be ground flush and dressed smooth. All welds on or behind surfaces which will be exposed to view shall be done so that finished surface will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. Remove weld splatter and welding oxides from all welded surfaces.

3. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads, where shown to be exposed to view, shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts of adjacent metal.
- D. Operating Mechanism: Operating devices, mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.
- E. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items for architectural metal work to be built into concrete, masonry, or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- F. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- G. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.
- H. Exposed Work: In addition to requirements specified herein or shown on drawings, all surfaces exposed to view shall be clean, and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs and other defects which mar appearance of finished work. Ornamental metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.
- I. Materials used shall be of such strength, thickness and alloy that they are capable of meeting all standards and descriptions specified herein and as detailed on drawings.

## 2.3 SHOP FINISHING

### A. General

1. Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated.
2. Provide colors or color matches as indicated on selected samples.
3. Protect mechanical finishes on exposed surfaces from damage by application of strippable temporary protective covering prior to shipment.
4. Corrosion Protection: Coat concealed surfaces which will be in contact with concrete, masonry, wood or dissimilar metals, in exterior work and work to be built into exterior and below grade walls and decks, with a heavy coat of bituminous paint. Do not extend coating onto exposed surfaces.

B. Aluminum

1. Class II Clear Anodized Finish: AA-M12C22A31, medium satin directional textured mechanical finish; inhibited chemical cleaning; 0.4 mil minimum thick anodic coating conforming to AAMA Spec. 607.1.
2. Class I Color Anodized Finish: AA-M12C22A42/A44, Smooth non-specular buffed mechanical finish; chemical etch, medium matte; 0.18 mil minimum thick integrally colored or electrolytically deposited coating conforming to AAMA 608.1 or 606.1.
  - a. Match color range of Commissioner's samples.
3. Baked Enamel Finish: AA-C21C42R1x, cleaned with inhibited chemicals, corrosion coated with an acid-chromate-fluoride-phosphate treatment, and painted with organic coating specified below. Apply baked enamel finish in strict compliance with paint manufacturer's specifications for cleaning, conversion coating and painting.
  - a. Organic Coating: Thermosetting modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with minimum dry film thickness of 1.5 mils; medium gloss.
4. High Performance Coating: AA-C12C42R1x, cleaned with inhibited chemicals, conversion coated with an acid-chromate-fluoride-phosphate treatment, and painted with organic coating specified below. Apply finish in strict compliance with paint manufacturer's instructions using a licensed applicator.
  - a. Fluorocarbon Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.
  - b. Custom color and gloss as selected by the Commissioner.

C. Steel

1. Powder-Coat Finish: Prepare, treat, and coat nongalvanized ferrous metal to comply with resin manufacturer's written instructions and as follows:
  - a. Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - b. Treat prepared metal with iron-phosphate pretreatment, rinse, and seal surfaces.
  - c. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
  - d. Color: Custom color selected by Architect.

## 2.4 PROTECTION

- A. Provide necessary protection to all exposed surfaces of architectural metal work, so as to prevent damage, staining, discoloration, abrasion, etc., to these surfaces from time of shipment from factory to acceptance of work of this project. Protection shall be provided by wrappings, strippable coatings, or other means. After installation, remove protective paper or strippable coating and clean exposed surfaces, and then provide additional temporary protection to protect architectural metal work from damage during subsequent construction activities. Surfaces which are damaged, stained, discolored, abraded etc., shall be rejected and replaced with new materials, at no cost to the City of New York.

## 2.5 STEEL FRAMING, BRACING, SUPPORTS AND REINFORCEMENTS

- A. Steel framing, plate reinforcing, supplementary steel framing or reinforcing, bracket assemblies, and the like required for the support, framing, reinforcing, bracing, etc., of work of this Section shall be of such sizes and shapes as indicated on the drawings, or as required to suit the conditions, and shall be provided with all necessary supports and accessory items such as inserts, hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly and rigidly fasten, anchor or attach work of this Section in place and to the concrete, masonry and other connecting and adjoining work.

## 2.6 ORNAMENTAL GATES

- A. Welded Connections: Fabricate gate panel inserts and frames by welding connecting members. Weld connection continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- B. Anchors: Gates shall be supported by anchored post connections only. Posts shall be set in concrete.
- C. Gate Hardware: Per hardware schedule in Section 087100, and security details. Prepare metalwork for security components and coordinate hardware with security interface components where required.

## 2.7 METAL BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by Fry Reglet Corporation, Pittcon Industries, Gordin, Inc., or approved equal.

- B. Aluminum Wall Base: 2-1/2" x 1/8" aluminum flat bar, light sanded, non-directional finish.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where ornamental metal work is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 INSTALLATION

- A. General: Install work of this Section square, plumb, straight, true to line or radius, accurately fitted and located, with flush, tight hairline joints (except as otherwise indicated or to allow for thermal movement), with provisions for other trades, with provisions to allow for thermal movement, with provisions to exclude water where exposed to weather, and with attachment devices as required for secure and rigid installation. It is the responsibility of the Contractor to assure himself that shop fabricated architectural metal items will properly fit the field condition. In cases where the shop fabricated architectural metal items do not fit the field condition, the item shall be returned to the shop for correction.

- B. Attachments

1. Unless otherwise indicated, work to be built into concrete or masonry shall be anchored with shop welded on galvanized steel strap anchors; work to be attached to concrete or masonry shall be anchored by bolts into embedded inserts or expansion shields; work attached to structural steel shall be anchored by welds or bolts; work attached to metals other than structural steel shall be anchored by bolts or screws. Power actuated fasteners not permitted unless approved by Commissioner. Provide all supplementary parts necessary to complete each item of work of this Section.
2. All attachment devices shall be of type, size and spacing to suit condition and as approved by Commissioner. Provide shims, slotted holes, or other means necessary for leveling, plumbing and other required adjustments. Attachment devices for work exposed to view shall be concealed, unless indicated otherwise. Where bolts or screws are permitted in work exposed to view, they shall be oval head and counter sunk, unless otherwise noted, with projecting end cut off flush with nuts or adjacent material, and shall match adjacent surfaces.
3. Do all necessary drilling, tapping, cutting or other preparations of surrounding construction in the field accurately, neatly and as necessary for the attachment and support of work of this Section, but obtain Commissioner's approval prior to such preparation to work of others.

- C. Tolerances: All work of this Section shall be plumb, square, level, true to radius and correctly aligned within the following limitations:

1. Offset from true horizontal, vertical and design location shall not exceed 1/16" per ten (10) feet of length for any component, not cumulative.
  2. Maximum offset from true alignment between abutting components shall not exceed 1/32".
- D. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units at Contractor's option.
- E. Install concealed gaskets and joint fillers as the work progresses, so as to make the work soundproof or lightproof as required.
- F. Restore protective coverings which have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.
- G. Retain protective coverings intact and remove simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.
- H. Field Welding: Comply with AWS Code for the procedures of manual shielded metal-arc welding, the appearance and quality of welds made, and the methods used in correcting welding work.

### 3.3 CLEANING

- A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Clean copper alloys according to metal finisher's written instructions in a manner that leaves an undamaged and uniform finish matching approved Sample.

### 3.4 PROTECTION

- A. Protect finishes of ornamental metal from damage during construction period with temporary protective coverings approved by ornamental metal fabricator. Remove protective covering at the time of Substantial Completion.
- B. Restore finishes damaged during construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

## SECTION 057010

### ORNAMENTAL GLASS RAIL SYSTEM

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ornamental glass rail system as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Glass balustrade as shown on drawings.
  - 2. Aluminum shoe.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Steel stairs - Section 055110.
- F. Ornamental metals - Section 057000.
- G. Glass and glazing - Section 088000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. General: Work of this section shall be fabricated and installed by an experienced fabricator or manufacturer who has been engaged in work of equivalent scope and fabrication standards for at least five (5) years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled, and erected.
- D. Special Experience Requirements
1. Installer: The contractor or subcontractor performing the work of this Section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Shop Drawings: Submit for all items of work, at full scale as far as practical, showing metal and glass thicknesses, arrangement of components, of joining, of jointing, details of all field connections and anchorages, diagrams and details explaining provisions for thermal movement, fastening and sealing methods, glazing methods, and support methods, metal finishes and all other pertinent information.
1. Engineering design and calculations for glass railing assembly - see Article 1.7 herein.
- C. Samples - Submit
1. Glass, 12" x 12" for each type and thickness indicated.
  2. Metal Finishes
    - a. Submit finish samples, 6" x 6", for finish system specified.
    - b. The samples submitted shall be representative of the workmanship and finishes of all work of this Section to be incorporated in the completed project.

#### 1.6 PRODUCT HANDLING

- A. Glass: At all times during transport, storage and handling of glass, provide cushions at glass edges to prevent damage. Protect glass faces from scratches and abrasion. Protect glass edges from chipping or other damage. Deliver each piece of glass with factory labels (indicating glass type, quality and thickness) and do not remove labels until installation has been approved.
- B. Glazing Materials: Deliver glazing materials in manufacturer's unopened containers, fully identified with trade name, color, size, hardness, type, class and grade. Store glazing materials where they will be free from damage in accordance with manufacturer's recommendations.

- C. Finished Materials: Protect finishes against soiling, staining or damage from scratches and abrasion. Maintain protection during construction until project completion or as otherwise directed by the Commissioner.
  - 1. Provide wrappings, strippable coatings or other means approved by the Commissioner.
  - 2. During construction, remove protection for visual observation of finish as directed by the Commissioner and replace to maintain protection.

#### 1.7 PERFORMANCE STANDARDS

- A. Glass rail assembly shall be designed and installed to resist the simultaneous application of a lateral force of 50 PLF and a vertical load of 100 PLF, both applied to the top of the railing. The rail shall resist a total lateral force and total vertical load of at least 200 lbs. each.
- B. Submit calculations and drawings signed and sealed by a Professional Engineer licensed in the State of New York indicating that glass rail system can meet these performance criteria.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Provide materials which have been selected for their surface flatness, smoothness, and freedom from surface blemishes where exposed to view in the finished unit. Surfaces exposed to view that exhibit pitting, seam marks, roller marks, "oil-canning," stains, discolorations, or other imperfections on the finished units will not be acceptable.
- B. Manufacturer: Blumcraft, Livers Bronze Co. Inc., CRL, or approved equal.
- C. Aluminum: Comply with the following standards for the forms and types of aluminum for the required items of work:
  - 1. Alloy and Temper: Provide alloy and temper as indicated or as otherwise recommended by the aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5; minimum thickness of 0.125".
  - 2. Finish: Aluminum to have mill finish with bituminous coating to separate it from dissimilar metals.
- D. Glass: Glass for rails shall be clear low-iron glass, Starphire by PPG or equal, laminated and tempered, 9/16" thick, two layers of 1/4" thick.
  - 1. Flat Glass: Clear, low iron, fully tempered, transparent and glazing quality conforming to ASTM C 1048.
  - 2. Laminated Safety Glass: Two flat glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, 0.030" thick, conforming to ASTM C 1172, unless otherwise indicated.

3. Exposed Edges: Arrised edge (1/16"), ground smooth and polished.
4. Sealed Edges: Arrised edge (1/16") and ground.

E. Glazing and Sealing Materials

1. Neoprene Setting Blocks: Solid 70 to 90 Shore A hardness, size to suit condition.
2. Neoprene Wedges and Spacers: Solid 50 Shore A hardness, size to suit condition.
3. Neoprene Cushions and Gaskets: Closed cell sponge, 20 to 30 Shore A hardness, size to suit condition.
4. Epoxy Adhesive: Pourable, non-shrinking, 70 to 80 Shore A hardness, formulated to suit glazing conditions and stress conditions.
5. Sealant: One-part silicone, sealant, 20 to 30 Shore A hardness, clear or custom color as selected by the Commissioner. "Silicone Sealant 1200" or General Electric. Sealant primers and backing as and if recommended by sealant manufacturer.

F. Protection for Metals: Bituminous paint conforming to FS TT-C-494.

G. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.

H. Fasteners: Furnish of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Unless otherwise shown, provide Phillips flat-head screws for exposed fasteners.

2.2 WORKMANSHIP

A. General: Materials, methods of fabrication, fitting assembly, bracing, supporting, fastening, and erection shall be in accordance with drawings and specifications, approved shop drawings, and of the highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled and erected.

B. Connections: Make connections with tight joints, capable of developing full strength of member, flush. Locate joints as approved by the Commissioner. Provide connections to allow for thermal movement of metal at locations and by methods approved by the Commissioner. For work exposed to view, use concealed fasteners with joints accurately fitted, flush and rigidly secured with hairline contacts.

1. Welding: Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces so that joint will not be visible; undercut metal edges where welds are required to be ground flush and dressed smooth. All welds on or behind surfaces which will

be exposed to view shall be done so that finished surface will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. Remove weld splatter and welding oxides from all welded surfaces.

2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads, where shown to be exposed to view, shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts of adjacent metal.
- C. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items for architectural metal work to be built into concrete, masonry, or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- D. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- E. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.
- F. Exposed Work: In addition to requirements specified herein or shown on drawings, all surfaces exposed to view shall be clean, and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs and other defects which mar appearance of finished work. Ornamental metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.
- G. Materials used shall be of such strength, thickness and alloy that they are capable of meeting all standards and descriptions specified herein and as detailed on drawings.

### 2.3 FABRICATION

- A. Tolerance: Unless otherwise indicated herein, all work of this section shall be plumb, square, level, and correctly aligned within the following limitations:
  1. Offset from true horizontal, vertical, and design locations shall not exceed 1/8" per 10' of length for any component, not cumulative.
  2. Maximum offset from true alignment between abutting components shall not exceed 1/32".
- B. Metal and Glass Railings
  1. Glass shall be tempered at straight runs and laminated where indicated. All glass shall be accurately cut to size at factory (field check dimensions), with clean cut edges. Vertical edges of glass shall be ground smooth with arrises eased and polished. Vertical edges of glass shall be square at abutting glass joints in straight

runs, mitered to angle indicated on drawings at abutting glass corner joints (unless otherwise indicated on drawings), and square or angled at terminating edges, as indicated on drawings to suit the plane of the surface against which the glass terminates. Tempering shall be done so that tong marks will be concealed in bottom shoe when glass is installed.

2. Aluminum shoes shall be fabricated from custom extruded aluminum sections (profiles as indicated on drawings). All joints at corners and directional change shall be mitered and continuously welded. All joints and shop connections shall be continuously welded, ground smooth and flush and dressed to match adjoining finish.
  - a. Surface Mount: L56S10D Base Shoe by CR Laurence Co., Inc.
  - b. Fascia Mount: L56S10F Base Shoe by CR Laurence Co., Inc.
  - c. Stair Assembly: Glass Rail Standoff Base and Cap, RS0B2134BS Base Component, custom modified, by CR Laurence Co., Inc.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where ornamental rail assemblies are to be installed and notify the the Commissioner of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 INSTALLATION

- A. General: Install work of this Section square, plumb, straight, true to line or radius, accurately fitted and located, with flush, tight hairline joints (except as otherwise indicated or to allow for thermal movement), with provisions for other trades, with provisions to allow for thermal movement, and with attachment devices as required for secure and rigid installation. It is the responsibility of the architectural metal erector to assure himself that shop fabricated architectural metal items will properly fit the field condition. In cases where the shop fabricated architectural metal items do not fit the field condition, the item shall be returned to the shop for correction.
- B. Attachments
  1. Unless otherwise indicated, work to be built into concrete or masonry shall be anchored with shop welded on galvanized steel strap anchors; work to be attached to concrete or masonry shall be anchored by bolts into embedded non-corrosive metal inserts or expansion shields; work attached to structural steel shall be anchored by welds or bolts; work attached to metals other than structural steel shall be anchored by bolts or screws. Power actuated fasteners not permitted unless approved by the Commissioner.
  2. All attachment devices shall be of type, size and spacing to suit condition and as approved by the Commissioner. Provide shims, slotted holes, or other means necessary for leveling, plumbing and other required adjustments. Attachment devices for work exposed to view shall be concealed, unless indicated otherwise.

3. Do all necessary drilling, tapping, cutting or other preparations of surrounding construction in the field accurately, neatly and as necessary for the attachment and support of work of this Section, but obtain the Commissioner's approval prior to such preparation to work of others.

C. Glass Railing

1. Aluminum shoes shall be securely, rigidly and accurately attached to adjoining construction, as detailed on drawings and as per approved shop drawings. All fastening devices shall be concealed.
2. Glass shall be set into aluminum shoe on top of solid neoprene setting blocks. Tong marks in tempered glass shall be concealed. Position glass correctly in shoe with solid neoprene wedges and spacers, and then fill spaces between glass and shoe with pourable epoxy adhesive (except where shoe is sloped, then fill spaces with packed lead wool), leave 1/4" space at top for silicone sealant. After epoxy adhesive has fully cured, seal 1/4" deep joints between glass and top of shoe with silicone sealant, neatly tooled flat and in same plane as top of shoe. Where indicated, also seal joint between top of aluminum shoe and adjoining construction with silicone sealant, neatly tooled flat and in same plane as adjoining surface of aluminum shoe. Color of sealant as selected by the Commissioner. Vertical joints between glass shall be plumb, properly and accurately located, with 1/16" space between glass or adjoining surface, unless otherwise indicated on drawings. Adjust glass, if necessary, so that all joint widths are the same.

3.3 CLEANING, PROTECTION AND ADJUSTMENT

- A. Cleaning and Protection: The Contractor shall protect all work for misuse or damage after installation has been completed. Work which is scratched, etched or damaged will not be accepted by the City of New York, and shall be replaced with acceptable work. Work shall also be protected against soiling, etching or other contamination. This work shall be done at no additional cost to the City of New York.
  1. The Subcontractor shall be responsible for all breakage of glass whatever the cause until the building is turned over to the City of New York. He shall replace all broken glass and deliver the entire building with all glazing intact and clean.
  2. Acceptance of building by the City of New York shall not take place until all glass has labels removed, is washed and polished, both sides, by a window cleaner specializing in such work.

END OF SECTION

## SECTION 057100

### DECORATIVE METAL STAIRS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural stairs as indicated on the drawings and specified herein, including, but not limited to, the following:
  - 1. Steel stairs with cast concrete treads and glass and stainless steel railings, including all clips, hangers, inserts, braces, and other supports.
  - 2. HHS stair stringer and HSS at landing.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Structural steel - Section 051200.
- F. Ornamental glass rail system - Section 057010.
- G. Wood strip flooring - Section 096400.
- H. Finish painting - Section 099000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions,

or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. General: Work of this section shall be fabricated and installed by an experienced fabricator or manufacturer, who has been engaged in work of equivalent scope and fabrication standards for at least three (3) years. Materials, methods of fabrication, fitting, assembly bracing, supporting, fastening, operating devices and erection shall be in accordance with drawings and specifications, approved shop drawings, and be of highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled and erected.
- D. Qualification of Welders: Use only certified welders and the shielded arc process for all welding performed in connection with the work of this Section. Protect adjacent surfaces when field welding to prevent damage or stain. Welders and welding operators must be qualified by tests as provided by AWS.
- E. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with:
1. "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.
  2. "Code for Welding in Building Construction" of the American Welding Society.
  3. "Metal Stairs Manual" of the National Association of Architectural Metal Manufacturers, for Architectural class stairs.
- F. Conflicting Requirements: In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards of these specifications, the provisions of the more stringent shall govern.

- G. Field Measurements: If construction process permits, take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress. Allow for trimming and fitting wherever taking field measurements before fabrication might delay work.
- H. Tolerances: Allow for construction tolerances as required.
- I. Coordination: Coordinate this work with the work of all other trades interfacing with architectural stairs, such as structural and other trades as required.

#### 1.5 DRAWING SUBMISSION

- A. General: It is the intent of the Working Drawings to display the layouts and general design parameters upon which the Shop Drawings shall be developed. Detail development and all connections shall be part of Shop Drawing Development. Show metal thicknesses, arrangement and joining of components, and details indicating provisions for thermal movement and fastening.
- B. Shop Drawings
  - 1. Before any architectural stairs are fabricated, submit shop drawings to the Commissioner for approval.
  - 2. Show all locations, markings, quantities, materials, sizes and shapes, and indicate all methods of connecting, anchoring, fastening, bracing, for the stair construction, support and attachment to the work of other trades.
- C. Engineering Data
  - 1. Before any architectural stairs are fabricated, submit engineering data drawings to the Commissioner for review. The Contractor is responsible for the structural design and supports for the stair system and must show his proposed system on these drawings.
  - 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of stair members. Calculations and drawings must be prepared by a Structural Engineer licensed in the New York and shall be signed and sealed by this Engineer.

#### 1.6 SAMPLES SUBMISSION

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.

- b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Submit the following listed samples and other samples as may be requested by the Commissioner, to show the quality standards:
  1. Metal Finishes
    - a. Submit finish samples, 6" x 6", for finish system specified.
    - b. The samples submitted shall be representative of the workmanship and finishes of all work of this Section to be incorporated in the completed project.
- C. Samples shall be submitted cleaned and shop primed and shall represent standards to which all respective materials used in the Project shall meet.

#### 1.7 PERFORMANCE STANDARDS

- A. Glass thicknesses indicated on drawings and/or specified herein are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Stairs and railings shall be constructed to conform to the following performance standards, unless greater required by Code:
  1. Stairs and platforms shall support a live load of one hundred (100) psf and a concentrated live load of three hundred (300) lbs. and shall have a live load deflection limited to 1/360 of the span. Loads shall not apply simultaneously.
  2. Railings shall withstand a two hundred (200) lb. force applied to rail from any direction, and a uniformly distributed load of 50 lbs./lin. ft. applied downward or horizontally, loads not to act simultaneously.

## 1.8 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect architectural stair before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Commissioner and at no additional cost to the City of New York.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Steel and Iron
  - 1. Steel Plates, Shapes and Bars: ASTM A 36.
  - 2. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
  - 3. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.
  - 4. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.
  - 5. Steel Pipe: ASTM A 53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.
  - 6. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
  - 7. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
  - 8. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
  - 9. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
    - a. Inserts shall be forwarded to the precast manufacturer in order to be cast into the precast elements.
  - 10. Bolts and nuts for stair assembly shall be high strength bolts, ASTM A 325 SC, with hardened washers.

- C. Bituminous Paint: Cold-applied asphalt mastic, ASTM D 1187.
- D. Stainless Steel and Glass Railing Assembly: Comply with Section 057010.
- E. Concrete Fill and Reinforcing Materials
  - 1. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 3000 psi.
  - 2. Nonslip-Aggregate Finish: Factory-packaged abrasive aggregate made from fused, aluminum-oxide grits or crushed emery; rustproof and nonglazing; unaffected by freezing, moisture, or cleaning materials.
  - 3. Welded Wire Fabric: ASTM A 185, 6 by 6 inches – W1.4 by W1.4, unless otherwise indicated.

## 2.2 FABRICATION

### A. General

- 1. Architectural stair work shall be fabricated by an experienced manufacturer in accordance with approved shop drawings and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand strains and stresses to which material will be subjected.
- 2. Fabricate shop assemblies in largest practical sizes to minimize field work. All exposed surfaces shall be clean and free from all dirt, stains, grease marks, scratches, waves, dents, buckles, tool marks, rattles, and other objectionable defects which mar appearance or use of finished work.
- 3. Cutting: Cut materials by sawing, shearing, or blanking. Flame cutting will be permitted when ground back to clean edges. Cuts shall be made accurately, clean, sharp and free of burrs, without deforming adjacent metals.
- 4. Connections: Make connections with tight joints, capable of developing full strength of the members, flush. Locate joints where least conspicuous. Use concealed fasteners where possible. Weld or rivet shop connections; bolt, screw or weld field connections.
  - a. Welding: Welds shall be continuous, except where spot welding is specifically permitted. Welding shall conform to the Standard Code of the American Welding Society. Exposed welds are required to be ground flush and smooth.
  - b. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts, or upset thread ends. Exposed bolts and screw head shall be flat and countersunk, unless otherwise indicated on drawings. Remove projecting ends of bolts and screws. Punch or drill holes; do not burn.

### B. Stairs and Platforms

1. Provide stringers, risers, sub-treads and platforms matching profiles as shown. Form tread pan and riser in a continuous piece to receive the finished tread. Weld risers and treads to carrier angles which shall be welded to the structural steel stringers. Fasten countersunk bolts or stud welded clips through mesh for cement fill. Provide welded-on clips for the support of gypsum drywall soffits, if indicated.
2. On intermediate platforms, provide metal bases. Miter and weld and grind smooth internal and external corners of metal bases. Form platform runs of minimum ten (10) gauge steel.
3. Countersink bolt heads and screws on finished surfaces or cut off flush with such surfaces.
4. Properly fit and securely fasten together all parts making exposed joints close fitting. Cut, drill, punch and tap as required for installation.
5. Make joints as strong and rigid as adjoining sections. Weld continuously along entire line of contact except where spot welding is indicated.
6. Give ferrous metal surfaces a shop coat of primer. Before painting, thoroughly clean surfaces with wire brushes or other proper and effective means of removing loose scale, filings or other objectionable materials.
7. Remove grease prior to painting. Separate dissimilar metals in or adjacent to work of this Section with a coat of bituminous paint on each surface prior to installation.
8. Closure and Filler Plates: Where indicated on drawings or as required, at least twelve (12) gauge sheet steel, securely fastened to top and bottom of stringer and adjacent wall, by welding or screws.
9. Struts, Hangers, Platform Headers and Subframing
  - a. Provide supports as detailed and required, including all struts, clip angles, angles or hangers which are required and necessary for support of stair construction.
  - b. Supports shall be of size suitable for the support load, as required. Struts, angles and hangers shall be supported by and directly connected to the structural framing. Struts and hangers, with their connections, shall be concealed.
  - c. Provide other inserts, anchors and/or other subframing as may be required to complete the stair construction and properly support it on the structural framing.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where architectural stairs are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do

not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

- A. Work in the field shall comply with the same requirements as specified for shop work above.
- B. Provide connecting members needed for properly securing the work to drywall and structural framing, including bolts, machine screws, rods, hangers, inserts, sleeves, plates, anchors, expansion bolts, washers and other items as required. Furnish built-in items to drywall trades as required for proper anchorage.
- C. Leave work exposed to view clean, smooth and neatly finished. All exposed welds shall be dressed smooth.
- D. Include supplementary parts necessary to complete each item even though such work is not definitively shown or specified.
- E. Coordinate and schedule the work of this Section with the work of other trades. Furnish anchors, sockets, fastenings and other miscellaneous items to be embedded in concrete or masonry, or required for securing metal work to other construction so as not to delay job progress.
- F. Install work plumb and true to the exact lines and levels, in the correct location and in proper relation to adjoining work.
- G. Touch up marred and abraded shop paint of exposed surfaces after erection in the field.

### 3.3 CLEANING

- A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

### 3.4 TOUCH-UP PAINTING

- A. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop coat, and paint exposed areas with same material used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

END OF SECTION

## SECTION 062000

### CARPENTRY

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the carpentry work as shown on the drawings and/or specified herein, including but not limited to, the following:
  - 1. Blocking and miscellaneous wood, including plywood wall lining for telephone and electric closets.
  - 2. Rough hardware.
  - 3. Coat closet pole and shelving.
  - 4. Installation only of finish hardware.
  - 5. Installation only of doors and hollow metal frames.
  - 6. Temporary controls furnished by Carpentry trades.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Architectural woodwork - Section 064023.
- F. Roofing - Section 075300.
- G. Steel doors and frames - Section 081113.
- H. Finish hardware - Section 087100.

#### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Lumber Standard: Comply with PS 20.
- C. Plywood Standard: Comply with PS 1 and American Plywood Assoc. (APA).
- D. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.
- E. Grade Marks: Identify lumber and plywood by official grade mark.
  - 1. Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
    - a. S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D 2016.
- F. Installation of doors, frames and hardware shall conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

#### 1.5 LEED PERFORMANCE REQUIREMENTS

- A. The following criteria are REQUIRED for the products included in this section:
  - 1. Engineered wood, not including salvaged wood, shall contain a minimum of 10% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  - 2. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the Submittal Requirements of this Section.
  - 3. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

4. Wood Materials harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section.
5. Permanently Installed wood-based materials used in this project that have been certified in accordance with the Forest Stewardship Council (FSC) guidelines shall be documented in accordance with the Submittal Requirements of this Section.
  - a. Applicable products include, but are not limited to, structural framing and general dimensional framing, flooring, finishes, built-in furnishings, miscellaneous blocking, fire rated plywood back panels used for equipment mounting, architectural panels, and plywood.
  - b. Certified wood material suppliers may be researched through the following websites: [www.rainforest-alliance.org/greenbuilding](http://www.rainforest-alliance.org/greenbuilding), [www.smartwood.org](http://www.smartwood.org), <http://www.certifiedwoodsearch.org/searchproducts.aspx>, [http://www.fscus.org/certified\\_companies/](http://www.fscus.org/certified_companies/).
  - c. Wood products previously purchased and used on prior projects, which are reused on this Project, are exempt from the FSC certification.
6. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419, Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints, and Coatings,(LEED BUILDING) where applicable.
7. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior shall meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.
  - a. Clear Wood Finishes
 

1). Varnish	350
2). Sanding Sealers	350
3). Lacquer	550
  - b. Shellac
 

1). Clear	730
2). Pigmented	550
  - c. Stains 250 |  - d. Floor Coatings 100 |  - e. Waterproofing Sealers 250 |  - f. Sanding Sealers 275 |  - g. Other Sealers 200 |
8. The calculation of VOC shall exclude water and tinting color added at the point of sale.
9. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.

- B. Prohibited Carcinogenic Compounds (Pressure-Treated Wood): International Agency for Research on Cancer (IARC), Lyon, France, [www.iarc.fr/](http://www.iarc.fr/)

1.6 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

- 1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:

- a. The amount of recycled content in the wood product(s). Identify post-consumer and/or post-industrial recycled content.
- b. Location in which wood materials were manufactured or fabricated and location from which wood was harvested.
- c. For wood products, indication (Y/N) of whether the supplied product(s) are certified by the Forest Stewardship Council (FSC).
- d. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment. Include total cost for all wood products and itemized costs for all FSC-certified wood products.

- 2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.

- 3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.

- 4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

- 5. Documentation that all composite wood and agrifiber products do not contain added urea-formaldehyde resins.

- 6. Chain of custody certificate to document FSC-certification, if applicable.

- B. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.

- C. Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with governing ordinances and that treatment will not bleed through finished surfaces.

- D. Submit 12" x 12" samples of plastic laminate finish of thickness specified for countertops.

#### 1.7 PRODUCT HANDLING

- A. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.
- B. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to type and kind.
- C. Pile lumber for rough usage, when delivered to the site in stacks to insure drainage and with a minimum clearance of six (6) inches above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.
- D. Do not store seasoned lumber in wet or damp portions of the building.
- E. Protect fire retardant treated materials against high humidity and moisture during storage and erection.
- F. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.
- G. All items specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.
- H. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

#### 1.8 JOB CONDITIONS

- A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Commissioner.
- B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

### PART 2 PRODUCTS

#### 2.1 WOOD MATERIAL

- A. General

1. All wood shall be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.
2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood shall be S4S, S-Dry, complying with PS-20.
3. Plywood and rough carpentry for telephone and electric closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treated as specified herein.
4. Provide plywood wall sheathing behind gypsum wallboard, where indicated, APA Structural 1 Rated Sheathing, Interior grade or better, with span rating to suit stud spacing; thickness as noted on drawings; and fire retardant treated as specified in herein. Plywood backing that is part of a fire-rated assembly shall meet all requirements as listed in the UL assembly approval.

B. Wood Treatment

1. All interior wood material specified herein shall be fire retardant treated to comply with the AWWA standards (C20 for lumber, C27 for plywood) for pressure impregnation with fire retardant chemical to achieve a flame spread rating of not more than 25 (UL Class "FR-S") when tested in accordance with UL Test 723 or ASTM E 84. The fire retardant chemicals used to treat the lumber must comply with FR-1 of AWWA Standard P17 and be free of halogens, sulfates and ammonium phosphate.
  - a. After treatment, kiln dry to a moisture content of fifteen (15) percent; if wood is to be painted or finished, kiln dry to a moisture content of twelve (12) percent. Treatment shall be equal to "Dricon" made by Arch Wood Protection Inc. or approved equal. Provide UL approved identification on treated materials.
2. For exterior blocking, roofing and sheet metal, pressure treat wood with copper azole, Type A (CBA-A); ammoniacal copper quat (ACQ) or similar preservative product that contains no arsenic or chromium. Preservative shall comply with AWWA Standard C-2 for lumber and C-9 for plywood, (.25 lbs./cubic foot of chemical in wood).
  - a. After treatment, kiln dry to a maximum moisture content of fifteen (15) percent. Treatment shall be equal to "Wolmanized Natural Select" made by Arch Wood Protection Inc. , Koppers or approved equal.
3. Treated wood which is cut or otherwise damaged shall be further treated in accordance with the AWWA Standard M-4.

## 2.2 HARDWARE

- A. Rough Hardware for Treated Woods and Exterior Use: Hot-dipped galvanized or Type 304 stainless steel.
- B. Nails: Common steel wire, untreated for interior work as per ASTM F 1667.
- C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:
  - 1. Bolts: ASTM A 307, Grade A.
  - 2. Nuts: ASTM A 563.
  - 3. Lag Screws and Bolts: ASME B 18.2.1.
- D. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2; use stainless steel for treated woods and exterior use.
- E. Wood Screws: ASME B 18.6.1.
- F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Commissioner.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION OF FINISH HARDWARE

- A. All finishing hardware specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.

- B. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.
- C. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.
- D. Unless otherwise noted, mount hardware units at heights established in Section 081113.
- E. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
- F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- G. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- H. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
- I. All keys used shall be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the City of New York.
- J. Adjusting and Cleaning
  - 1. Adjust and check each operating item of hardware and each door, to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
  - 2. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

### 3.3 INSTALLATION OF DOORS AND FRAMES

#### A. Preparation

- 1. Remove welded-in shipping spreaders installed at factory.

2. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
3. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

#### B. Installation

1. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
  - a. Install frames in accordance with ANSI 250.11-20001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.
  - b. At fire-protection-rated openings, install frames according to NFPA 80.
  - c. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
  - d. Install frames with removable glazing stops located on secure side of opening.
  - e. Frames set in masonry walls shall have door silencers installed in frames before grouting.
  - f. Remove temporary braces necessary for installation only after frames have been properly set and secured.
  - g. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.
  - a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar; refer to Section 042000 "Unit Masonry" for installation of frames in masonry walls.
  6. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  7. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
  9. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.
  10. Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.
    - a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  11. Glazing: Comply with installation requirements in Division 8 Section "Glass and Glazing" and with standard steel door and frame manufacturer's written instructions.
    - a. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.
- C. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

### 3.4 BLOCKING AND MISCELLANEOUS WOOD

#### A. General

1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.
2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.

3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

B. Blocking and Miscellaneous Wood

1. Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers shall be continuous wherever required, whether or not so indicated.
2. Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.
3. Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

C. Rough Lumber for Roofing and Sheet Metal

1. Furnish and install all wood nailing strips and wood blocking required in connection with respective types of roofing, fans, flashings, and sheet metal work, using preservative treated wood as herein before specified.
2. Wood blocking shall be of sizes and shapes as indicated on the drawings and/or designed for the reception of curb flashings for roof ventilators and similar items.
3. All nailing strips and blocking shall be carried out in accordance with the printed installation instructions, and/or recommendations of the accepted manufacturer of the roofing materials, and in coordination and cooperation with the sheet metal work trades.
4. All blocking and nailing strips shall be firmly secured in place using counter bored bolt and nut fastenings, or secured by any other proposed flush surfaced fastenings.
5. Wood nailing strips or blocking required to be embedded in concrete work shall be furnished in time due for placing, prior to start of concrete operations. Locations and spacings of nailing strips or blocking shall be performed in coordination with the concrete trades, as required for respective installations.

3.5 TELEPHONE AND ELECTRIC EQUIPMENT MOUNTING BOARDS

- A. Furnish and install 3/4" thick plywood panels to the walls of the telephone and electric equipment rooms in accordance with the requirements of the local utility company.

- B. Secure to wall using proper devices for substrates encountered, spaced twelve (12) inches o.c., maximum around the edges, 1-1/2" from corners, and in three (3) rows of three (3) each in the field. Recess fastening devices flush with the plywood surface. Adjacent panels shall be butted with 1/16" space between without lapping.

### 3.6 ROUGH HARDWARE

- A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.
- B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.
- C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.
- D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.
- E. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.
- F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.
- G. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

### 3.7 CLEANING UP

- A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.
- B. Sweeping
  1. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
  2. Remove the refuse to the area of the job site set aside for its storage.
  3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION

SECTION 064023

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural woodwork as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Custom bamboo millwork, including the following:
  - a. Circulation desks
  - b. Self-Check millwork
  - c. Shelving enclosures for bookstacks
2. Wood casework and counters with plastic laminate finish (for Staff lounge cabinets)
3. Hardware for casework.
4. Solid plastic surfacing materials (for Computer Table)
5. Wood framing and rough lumber as required for work of this Section.
6. Wood grounds, blocking, nailers, furring as required for work of this Section.
7. All rough hardware and fastenings for work of this Section.
8. Drilling concrete and masonry, drilling and/or tapping metal work, as required, for the installation of work of this Section.
9. Back painting as specified herein.
10. Shop finish of work of this Section, except items indicated herein to be shop primed only.

1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.

- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Carpentry - Section 062000.
- F. Caulking between architectural woodwork and any wall, floor, or ceiling joints - Section 079200.
- G. Wood doors - Section 081416.
- H. Glass - Section 088000.
- I. Field finishing - Section 099000.

#### 1.4 QUALITY STANDARDS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. The quality standards of the Architectural Woodwork Institute, "Architectural Woodwork Standards," 1<sup>st</sup> Edition, dated October 1, 2009, shall apply to all workmanship including materials and installation, for architectural woodwork and by reference are made a part of this specification. All work shall conform to "Premium" grade requirements of the AWI "Architectural Woodwork Standards," unless otherwise modified herein.
- C. In the event of a dispute as to the quality grade (or grades), the Contractor shall call upon the Architectural Woodwork Institute for an inspection under AWI's Quality Certification Program which shall include a QCP Inspection and Report. The Contractor agrees to abide by the decision of this Report. The cost of said inspection and report shall be borne by the Contractor.
- D. Employ only tradesmen experienced in the fabrication and installation of architectural woodwork.
- E. Millwork manufacturer must be an accredited Quality Certified Premium manufacturer by the AWI.

#### 1.5 LEED PERFORMANCE REQUIREMENTS

- A. The following criteria are REQUIRED for the products included in this section:

1. Engineered wood, not including salvaged wood, shall contain a minimum of 10% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
2. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the Submittal Requirements of this Section.
3. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.
4. Wood Materials harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section.
5. Permanently Installed wood-based materials used in this project that have been certified in accordance with the Forest Stewardship Council (FSC) guidelines shall be documented in accordance with the Submittal Requirements of this Section.
  - a. Applicable products include, but are not limited to, structural framing and general dimensional framing, flooring, finishes, built-in furnishings, miscellaneous blocking, fire rated plywood back panels used for equipment mounting, architectural panels, and plywood.
  - b. Certified wood material suppliers may be researched through the following websites: [www.rainforest-alliance.org/greenbuilding](http://www.rainforest-alliance.org/greenbuilding), [www.smartwood.org](http://www.smartwood.org), <http://www.certifiedwoodsearch.org/searchproducts.aspx>, [http://www.fscus.org/certified\\_companies/](http://www.fscus.org/certified_companies/).
  - c. Wood products previously purchased and used on prior projects, which are reused on this Project, are exempt from the FSC certification.
6. Adhesives or sealants used for work in this section shall meet the requirements of Section 01015, Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints, and Coatings,(LEED BUILDING) where applicable.
7. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior shall meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.
  - a. Clear Wood Finishes
 

1).	Varnish	350
2).	Sanding Sealers	350
3).	Lacquer	550
  - b. Shellac

1).	Clear	730
2).	Pigmented	550
c.	Stains	250
d.	Floor Coatings	100
e.	Waterproofing Sealers	250
f.	Sanding Sealers	275
g.	Other Sealers	200

8. The calculation of VOC shall exclude water and tinting color added at the point of sale.

9. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.

1.6 SUBMITTALS

A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
  - a. The amount of recycled content in the wood product(s). Identify post-consumer and/or post-industrial recycled content.
  - b. Location in which wood materials were manufactured or fabricated and location from which wood was harvested.
  - c. For wood products, indication (Y/N) of whether the supplied product(s) are certified by the Forest Stewardship Council (FSC).
  - d. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment. Include total cost for all wood products and itemized costs for all FSC-certified wood products.
2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

5. Documentation that all composite wood and agrifiber products do not contain added urea-formaldehyde resins.
6. Chain of custody certificate to document FSC-certification, if applicable.

B. Shop Drawings

1. Submit shop drawings of all woodwork specified and indicated on the drawings. Shop drawings shall indicate room plans and elevations at 3/4" equals 1'-0" scale and typical construction details at 3" equals 1'-0" scale. Shop drawings shall indicate all materials, thicknesses and finishes.
2. Shop drawings shall show all finish hardware, anchors, fastenings and accessories.
3. Shop drawings shall show all jointing, joint treatment and butt jointing in veneers, plastic laminate, and solid surfacing materials.
4. Shop drawings for cabinet work must show centerline height and horizontal location of all required internal wall blocking.
5. Where architectural woodwork deviates from AWI standards noted herein, shop drawings must identify these deviations.

C. Samples: Submit samples of each of the following items:

1. Plastic laminate, twelve (12) inches square, including a section of outside corner.
2. Finish for bamboo plywood, twelve (12) inches square, including a section of outside corner.
3. Cabinet hardware.

1.7 QUALIFICATIONS

A. Special Experience Requirements

1. Installer: The contractor or subcontractor performing the work of this Section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

1.8 COORDINATION

- A. Coordinate the work of this Section with other appropriate Sections of the specifications to insure proper scheduling for fabrication and installation of the work specified herein
- B. Coordinate with partition and finish trades to insure that proper provisions are made for the installation of the work specified herein.
- C. Verify all dimensions in the field prior to fabrication of all Architectural Woodwork to assure proper fit.

1.9 PRODUCT HANDLING

- A. All materials and work of this Section shall be protected from damage, from time of shipment from shop to final acceptance of work. Cover, ventilate, and protect work of this Section from damage caused by weather, moisture, heat, staining, dirt, abrasions, any other causes which may adversely affect appearance or use, or which may cause deterioration of finish, warping, distortion, twisting, opening of joints and seams, delamination, loosening, etc., of work of this Section.
- B. Keep all finish carpentry, millwork, and cabinet work under cover both in transit and at the premises. Do not deliver any finish carpentry, millwork or cabinet work before it is required for installation. Protect such work to avoid damage in transit, during erection and after erection until acceptance of the building; use all such methods to provide the proper protection. Remove such protection when directed by the Commissioner.
- C. Deliver finish carpentry, millwork, and cabinet work in a dry stable condition; protect same against injury and dampness. Do not store or install finish carpentry, millwork or cabinet work until after the concrete, masonry and plaster work are thoroughly dry.
- D. Damaged or defective items of work of this Section are subject to rejection and replacement with new by Contractor, at no cost to the City of New York.

1.10 JOB CONDITIONS

- A. Humidity Controls: The ambient relative humidity at the site, including both the storage and the installation areas, shall be maintained between 25% and 55% prior to delivery and through the life of the installation.
- B. Determine equilibrium moisture content and maintain required temperature and relative humidity as required for a tolerance of plus or minus one (1) percent of the specified optimum moisture content until woodwork receives specified finishes. Refer to "Guide to Wood Species Selection," AWI, for method of determining equilibrium moisture content values.
- C. Examination of Substrate and Conditions: The installer must examine the substrate and the conditions under which the work of this Section is to be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- D. Areas to receive architectural woodwork must be fully enclosed with windows and/or curtain wall installed and glazed, exterior door in place, HVAC systems operational and temporary openings closed. Any plaster, wet grinding and concrete work shall be fully dry.
- E. Architectural woodwork shall be allowed to come to equilibrium on site for 7 days prior to installation.

## PART 2 PRODUCTS

### 2.1 BASIC REQUIREMENTS

- A. Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of nine (9) to twelve (12) percent for exterior work and six (6) to eleven (11) percent for interior work.
- B. Measurements: Before proceeding with woodwork required to be fitted to other construction, obtain field measurements and verify all dimensions of shop drawing details as required for accurate fit.
- C. Compatibility of Grain and Color: The Commissioner reserves the right to select materials for best compatibility between visually related members and veneers.
- D. Machine and sand woodwork to comply with requirements of Standards for specified grade.
- E. Fabricate woodwork to dimensions, profiles and details shown. Rout or groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.
- F. Miter joints by joining, splining and gluing to comply with requirements for the specified grade.
- G. Inspect each piece of lumber and plywood or each unit of woodwork after drying; do not use twisted, warped, bowed or otherwise damaged or defective wood.
- H. Cores and substrates used in the Conservation spaces, and other spaces as noted, shall be free of urea formaldehyde and shall be marine grade plywood.

### 2.2 GENERAL - MATERIALS

- A. Softwood lumber shall conform to the requirements of the latest edition of American Lumber Standards Simplified Practice Recommendation R-16. Grades shall conform to the grading rules of the Association having jurisdiction, and shall bear the official grade and trademark of the Inspection Bureau of the Association and a mark of mill identification.
- B. Framing and Rough Lumber: No. 1 KD grade Southern Pine or Dense Construction grade Douglas Fir, having extreme fiber in bending stress of at least 1700 psi, surfaced four sides (S4S). Provide fire retardant treatment meeting requirements of Section 062000.
- C. Grounds, Blocking, Nailers, Furring: Southern Pine, Douglas Fir or Sitka Spruce, grade to suit particular purpose and to be straight, square edged, straight grained, surfaced four sides (S4S), and which will retain nails and screws without splitting. Provide fire retardant treatment.
- D. Plywood: AWI Section 4; Veneer core, particleboard, or plywood core unless otherwise specified, and with the following requirements:

1. Hardwood: Premium Grade, face veneers as shown or specified
  2. Particleboard: Premium Grade, fire retardant for wall paneling only equal to Duraflake FR and Duraflake for cabinets. In addition, particleboard and MDF shall be certified to the following EPP CPA 3-08 formaldehyde emission limits:
    - a. Particleboard meets 0.18 ppm.
    - b. MDF meets 0.21 ppm.
  3. Edges: Banded with hardwood in accordance with Premium Grade Standards.
- E. Bamboo Millwork Panels: 3/4" thick plywood panels, Signature Naturals Prefinished Vertical grain Caramelized by Teragren; no substitutions. Seal with water-based heavy-duty matte sealer.
1. Single Lamination Solid: Bamboo strips laminated together, in a single lamination from face to face, and made without internal voids.
  2. Three-Ply Lamination Solid: Bamboo strips laminated together in a 3-ply configuration, with the face layers oriented perpendicular to the core.
  3. MDF Bamboo Panels: Bamboo veneer laminated onto an MDF core (available in one good side, or two good sides).
  4. Formaldehyde-Free MDF Panels: Bamboo veneer laminated onto a formaldehyde-free MDF core (available in one good side, or two good sides).

## 2.3 PLASTIC LAMINATE

- A. Provide ColorCore, New White, gloss finish, by Formica or approved equal.
- B. Edges: Finish with plastic laminate to match face and applied before face sheets are applied, unless otherwise shown or specified.

## 2.4 METAL

- A. Steel
  1. Structural Steel Shapes and Plates: ASTM A 36.
  2. Hot-Rolled Carbon Steel Sheets: Commercial quality, ASTM A 569, may be used for concealed parts only. Galvanize sheets for planters.
  3. Finishes
    - a. Primer for Unexposed Metal: Zinc chromate primer.

## 2.5 MISCELLANEOUS PRODUCTS

- A. Fasteners

1. Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.
2. Nails: FS FF-N-105, type, size, material and finish as required for the condition of use.
3. Anchors: Type, size, material and finish as required for the condition of use.
4. Staples: Upholstery type staples of sufficient strength to hold fabric taut in place without sagging.

B. Adhesives

1. For Laminating Plastic Laminate Surfaces: Urea resin, Type II, as recommended by fabricator.
2. For All Other Uses: Polyvinyl acetate resin emulsion or other type as recommended by the fabricator.

2.6 CABINETS WITH PLASTIC LAMINATE FINISH

A. General

1. Fabricate all cabinetry and millwork to the "Premium Grade" standards of the AWI, Section 10.
2. Face construction of cabinets shall be "Flush Overlay."
3. Provide 3/4" thick doors, drawer fronts and fixed panels (including thickness of plastic) except where required to be thicker by Standards; and provide flush units.
4. Provide dust panels of 1/4" thick plywood or tempered hardboard above compartments and drawers, except where located directly below countertops.
5. Exposed Edges: Plastic laminate matching exposed panel surfaces. Ease exposed edge of overlap sheet.

B. Shop Assembly: All work shall be shop assembled. Work that is too large for entrance into the use area shall be fabricated in attachable sections with provisions for reconnection in the using space.

C. Material Thicknesses: See drawings for general materials thicknesses. Minimum thickness of solid lumber for web frames, trim, bases, etc., shall be 3/4". Minimum thickness of plywood and particleboard shall be 3/4".

D. Sizes: See drawings for woodwork sizes required. The manufacturer shall check field dimensions and verify all openings and actual field conditions prior to fabrication of work.

E. Manufacturer is responsible for rigidity and structural stability.

2.7 PLASTIC LAMINATE COUNTERTOPS AND VANITIES

- A. Grade: Same as AWI grade required for cabinet work; plastic laminate finish.
- B. Construction
  - 1. Provide back-splash and end-splash, where detailed; top-mounted square butt joint, fully covered with matching plastic laminate, eased edges.
  - 2. Exposed Counter Edges: Plastic laminate matching surface, except as otherwise indicated. Ease exposed edges of overlap sheet.
  - 3. Cut openings for equipment to be installed. Comply with equipment manufacturer's requirements, but provide internal corners of 1/8" minimum radius. Smooth saw cut and ease edges.
  - 4. Seal cut edges of counter at openings for sinks and other "wet" equipment, using waterproofing compound recommended by plastic manufacturer and compatible with laminating adhesive.

2.8 CABINET HARDWARE

- A. Architectural Woodwork Hardware: Provide the following items, or their approved equal, as required:
  - 1. Hinges: Hafele concealed hinges.
  - 2. Catches: Magnetic; top and bottom.
  - 3. Pulls: Satin SS DL-90/S.
  - 4. Milwork work surface brackets: Haeefele work surface brackets.
  - 5. Locks: Directed by the Commissioner.
  - 6. Drawer Slides: Accuride, Model 7434, full extension, 100 lb. capacity.
  - 7. Brackets: Hafele Work Surface Brackets, size according to drawings, color White.
  - 8. Shelf Supports: Pin and grommet system equal to No. 282.01.701 pin and 282.50.704 grommet made by Hafele.
  - 9. Finish: Satin Stainless Steel.
  - 10. Closet Hardware: Oval wardrobe rails, chrome plated steel with center bracket and wall support brackets made by Hafele or approved equal.
  - 11. Work Surface Brackets - Connectors and Shelf Supports: Haeefele Work Surface Brackets, white, or approved equal.

## 2.9 SOLID PLASTIC MATERIALS

- A. Provide 1/2" thick "Corian" surfacing material as manufactured by E.I. Du Pont or approved equal made by Avonite, Wilson Art or Gibraltar meeting standards specified herein.
  - 1. Locations: Computer table top and supports.
  - 2. Colors: Black.
- B. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124-1980, Type Six, and ISS FA-2.01 "Classification and Standards Publication of Solid Surfacing Material" as published by the International Solid Surface Fabricator Association.
- C. Surfacing materials shall be adhesively joined with no exposed seams, having edge details shown on drawings.
- D. Material shall conform to the published performance characteristics of ISSFA-2-01.
- E. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints.
- F. Sealant: Manufacturer's standard mildew-resistant, FDA/UL recognized silicone sealant in colors matching components.
- G. Fabrication
  - 1. Fabricator must be approved by the solid surface manufacturer.
  - 2. Factory fabricate components to custom sizes and shapes indicated, in accordance with approved shop drawings.
  - 3. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints.
  - 4. Provide factory cutouts for fittings and accessories as indicated on the drawings.
  - 5. Cut and finish component edges with clean, sharp returns. Route radii and contours to template. Repair or reject defective and inaccurate work.
- H. Warranty: The manufacturer shall warrant to the City of New York that manufacturer will at its option repair or replace without charge, such product if it fails due to a manufacturing defect during the first 10 years after initial installation. This includes all labor charges needed to repair or replace the product covered hereunder.

## 2.10 FABRICATION - GENERAL

- A. Provide lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.

- B. Do all fabrication from field measurement with provision for scribing as required to meet built-in conditions.
- C. Coordinate the work of this Section with the work of other trades.
- D. Fabricate units in largest practicable sections. Assemble in the shop for trial fit, disassemble for shipment and reassemble with concealed fasteners.
- E. Maintain relative humidity and temperature during fabrication, storage and finishing operations matching that of the areas of installation.
- F. Details indicate the required type and quality of construction. Modifications to conform to manufacturer's standards will be considered providing they comply with the Contract Documents, maintain the profiles shown and subject to acceptance by the Commissioner.
- G. Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.
- H. Factory finish all items where possible. Defer final touch-up, cleaning and polishing until after delivery and installation.
- I. Comply with AWI, Premium Grade standards for sanding, filling countersunk fasteners, back priming and similar preparations for the finishing of architectural woodwork, as applicable to each unit of work.
- J. Prepare all countersunk wood screw attachments for wood plugs. Wood plugs shall match surrounding species and grain direction; putty filling is not acceptable.

#### 2.11 FABRICATION - SPECIFIC ITEMS

- A. Casework
  - 1. Include all preparations for mechanical, electrical, telephone and plumbing work required.
  - 2. Provide cabinet hardware for casework as shown.
  - 3. Provide dust panels in body webs and between drawer units.
  - 4. Provide exposed surfaces as specified herein before.
  - 5. Hollow core doors will not be permitted.
  - 6. Provide matching veneers for edge treatments of case body members where transparent finishes are indicated or specified.
  - 7. Provide drawers with slides as specified. Drawers shall not rest on web body frames.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where architectural woodwork is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 FRAMING

- A. Use specified framing lumber, sizes and spacing as indicated on drawings and as required to support loads.
- B. Framing shall be cut square on bearings, closely fitted, accurately set to required lines and levels, rigidly secured in place at bearings and connection with nails, lag screws and/or bolts as required by conditions.

### 3.3 GROUNDS, BLOCKING, NAILERS AND FURRING

- A. Provide all wood grounds, blocking, nailers, furring, and the like for work of this Section, where shown and where required, dressed to size indicated or required to suit the condition. Install grounds, blocking, nailers, furring, etc., rigidly, in proper alignment, trued with a long straight edge.

### 3.4 ROUGH HARDWARE

- A. Provide all rough hardware, such as nails, screws, bolts, anchors, hangers, clips and similar items. Hardware shall be of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner. Use galvanized hardware at exterior walls, and at other locations where subject to moisture or where water will be present.
- B. Secure wood to concrete and to solid masonry with countersunk bolts in expansion sleeves or other approved manner, to steel with countersunk bolts, to hollow masonry and to drywall with heavy duty countersunk toggle bolts. Space fastenings not more than sixteen (16) inches apart. Hardened cut nails, power-driven fastenings, or other suitable devices may be used where approved by the Commissioner.
- C. Connections and fastenings shall be made in such manner as will compensate for swelling and shrinkage and shall permit the work to remain permanently in place without any splitting or opening of joints.

### 3.5 INSTALLATION OF CABINET FINISH HARDWARE

- A. All items of finish hardware furnished under this Section shall be carefully fitted and secured in place as part of the work of this Section. Locations and positioning of hardware shall be subject to the Commissioner's approval. Care shall be taken not to mar or damage hardware, or other work. Install doors plumb and true. Hardware shall be fitted to assure operation without forcing.

- B. After preliminary fitting of hardware, the Contractor shall remove trim for painting and finishing work; after which he shall reinstall the hardware in a permanent manner.
- C. Upon completion of the work, before final acceptance of the building by the City of New York, the Contractor shall, in the presence of the Commissioner, show that all hardware is in satisfactory working order; fit all keys in their respective locks and, upon acceptance of the work, shall tag and deliver all keys to the Commissioner and City of New York.
- D. When directed by the City of New York, at any time during the first year after the completion of the Contract, the Contractor shall return to the building and adjust and refit the work and hardware, and leave such items in satisfactory working order.

### 3.6 GENERAL INSTALLATION

- A. Wall anchorage and general installation procedures for cabinetry work shall conform to AWI Section 10, Article entitled "EXECUTION", Sub-Article 6.1 with all related subparagraphs.
- B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offset in revealed adjoining surfaces.
- C. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

### 3.7 CABINET WORK AND MILLWORK

- A. General
  - 1. Materials and workmanship shall conform to the Quality Standards of the Architectural Woodwork Institute specified herein and to the drawings.
  - 2. Cabinet work and millwork shall be performed by experienced cabinet work and millwork company, having craftsmen skilled in their trade.
  - 3. Fabricate all cabinet work and millwork completely in the shop, in complete and/or as large units as practical, leaving only fitting, assembly, installation and a minimum of fabrication and finishing to be done at the building. Assembled work shall be rigidly secured and permanently fastened together with concealed fasteners.
  - 4. Afford Commissioner every facility for inspection of work at shop or mill at such times as the Commissioner may select.

5. As far as practicable, use concealed fastenings for joining and assembling the work. Where this is impossible, the means of securing shall be placed in inconspicuous places and methods of joining and assembling submitted for Commissioner's approval prior to fabrication.
  6. Mill all finish wood accurately to detail, with clean cut moldings, profiles and lines, machined, sanded smooth, housed, jointed, blocked, put together in the best manner, with provision for swelling and shrinkage, and to assure the work remaining in place without warping, splitting or opening of joints.
  7. Cut trim to dimensions and profiles shown, from solid stock.
  8. Make all trim and the like in single lengths wherever possible; joints mitered, glued and splined. Continuous members shall have tight flush joints, doweled or splined and glued.
  9. Make all joints hairline tight, fitted accurately and joined with hardwood splines or dowels, glued together, or by other method approved by Commissioner. Use screws, not nails, for fastenings.
  10. Gluing shall, where practicable, be by the hot plate press method and glued surfaces shall be in close contact throughout. Glue stains on finished work will not be permitted.
  11. Cover surface fastenings, where permitted, with matching wood plugs or wood putty. Finish exposed edges of plywood with matching solid stock. Lock miter external corners; tongue and groove internal corners to allow for contraction and expansion.
  12. Machine sand with grain, finish with hand sanding, leave exposed surfaces free from machine or tool marks that will show through the finish.
  13. Work which adjoins drywall, concrete, or other finish shall be fitted and scribed in a careful manner and ample allowance shall be given for cutting and scribing.
  14. Erect work true to lines, levels and dimensions, square, aligned and plumb, securely and rigidly fastened in place.
- B. Cabinet Work: Provide all items of cabinet work indicated on drawings and as herein specified.
1. Tops, sides, backs, bottoms, dividers, shelves, fronts, doors and drawer fronts shall be of plywood or flakeboard core, with the specified wood veneer or plastic laminate as indicated on drawings.
  2. Drawer sides and backs shall be 1/2" thick solid clear selected white birch, suitable for clear finish. Drawer bottom shall be 3/8" thick plywood with clear selected white birch veneers, suitable for clear finish.
  3. Cabinet doors and drawers shall be flush mounted.

4. Adjustable shelves in cabinets shall have grommets spaced 2" o.c.
  5. Fixed shelves shall be dadoed into side supports and glued.
  6. Shelves shall be 3/4" thick for spans up to 30"; for spans in excess of 30" to 48" shelves shall be 1" thick.
  7. All cabinets shall have closed top, sides, bottom, and back with veneers to match face work. Cabinets to fit accurately into indicated locations; scribe moldings permitted only where indicated.
  8. Countertops, counters, counter fronts, shelves, etc., indicated on drawings to have plastic laminate, shall have plastic laminate shop applied to 3/4" thick core, with plastic laminate backing sheet on underside or back of countertops, counters and shelves. Plastic laminate shall be pressure laminated to core with laminate at external corners. Provide concealed wood framing to support plastic laminate counters, securely fastened to wall and to underside of counters.
- C. Countertops shall be installed to support a minimum concentrated live load of 150 lbs. acting downward at mid span at outer edge of counter without causing deformation and damage.

### 3.8 PAINTING AND FINISHING

- A. General: All painting and finishing work of this Section shall be shop applied, unless otherwise noted, as specified below. All painting and finishing shall match approved samples. Field finish painting, where specified below, shall be by painting Subcontractor, as specified for in Painting Section.
- B. Schedule of Painting and Finishing
1. Shop Primer On:
    - a. Wood trim and moldings to be field finish painted.
    - b. Ferrous metal work.
- C. Back-Painting: All work of this Section in contact with concrete or masonry or other moisture areas and all concealed surfaces of cabinet and millwork, shall be back-painted with one (1) coat of oil based paint prior to installation, shop applied where practicable.
- D. Field Touch-Up: Field touch-up shall be the responsibility of the installing Subcontractor, and shall include the filling and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and mars, and final cleaning up of the finished surfaces.

### 3.9 CLEAN UP AND PROTECTION

- A. Clean Up: At regular intervals during the course of the work, all debris and excess material shall be cleaned up and removed from the site. Upon completion of installation, clean all spaces of debris caused by woodwork installation.

- B. Protection: Protect all woodwork from marring, defacement of other damage until final completion and acceptance of the project by the City of New York. Repair or replace all defective units prior to final inspection as directed by the Commissioner. Any units that cannot be satisfactorily repaired in the opinion of the Commissioner shall be replaced with new units of same original design, at no additional cost to the City of New York.

END OF SECTION

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## SECTION 071610

### CAPILLARY WATERPROOFING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the capillary waterproofing as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Capillary waterproofing system for interior surfaces of concrete pits and trenches, including elevator pits.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Concrete - Section 033000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

##### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Building Submittal Requirements: The Contractor or subcontractor shall submit the following:
1. Material Safety Data Sheets (MSDS) for all applicable products. Applicable products include, but are not limited to, adhesives, sealants, carpets, paints, and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted. (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer's literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content.)
- C. Shop Drawings: Submit shop drawings showing details at terminations, at joints, at intersection of horizontal and vertical surfaces, and at penetrations in waterproofing system.
- D. Product Data: Submit manufacturer's technical information and installation instructions for all materials of this Section.
- E. Contractor's Certification: Submit per Article 1.6.
- F. Subcontractor's Qualifications: Submit per Article 1.7.
- 1.6 STORAGE OF MATERIALS
- A. All materials shall be stored in their original tightly sealed containers or unopened packages; shall be clearly labeled with the manufacturer's name, brand name and number, and batch number of the material where appropriate.

- B. Materials shall be stored in a neat and safe manner so as not to exceed the allowable live load of the storage area.
- C. Material shall be stored out of the weather in a clean, dry area.

#### 1.7 MANUFACTURER'S REPRESENTATIVE

- A. Contractor shall require representative of manufacturer of the waterproofing material to provide field instructions and supervision of the installation of the complete waterproofing system.
- B. Contractor shall require the manufacturer's representative to make sure that the subcontractor's workmen are fully instructed and trained in the handling and application of all the materials, and shall see that all the materials are correctly installed.
- C. Upon completion of the installation, the Contractor shall submit to the Commissioner a written certification that the representative of the manufacturer of the waterproofing material has supervised the work of this Section and that all materials are correctly installed.

#### 1.8 QUALIFICATIONS OF SUBCONTRACTORS

- A. Subcontractors: All work of this Section shall be performed by a subcontractor who is approved by the manufacturer of the waterproofing material.

#### 1.9 WARRANTY

- A. The Contractor and manufacturer shall jointly warrant the waterproofing system executed under this Section to be watertight and free from defects in materials and workmanship for a period of ten (10) year from date of acceptance of this Contract, and that he, at his own expense, repair and/or replace all other work which may be damaged as a result of such defective work, and which becomes defective during the warranty period.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Waterproofing materials shall be a cement bond compound, free from chloride and iron oxide, which waterproofs by crystalline growth through the capillary tracts and shrinkage cracks in the concrete substrate equal to "Aqua-Fin IC", as manufactured by Aqua-Fin Inc., or equal made by Xypex Chemical Corp. or Anti-Hydro Co.
- B. Mixing Water: Potable.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where capillary waterproofing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

- A. Temperature Requirements: Surrounding temperatures shall be a minimum thirty-five (35) degrees F. for forty-eight (48) hours before, during and after installation.

- B. Preparation of Surfaces

1. Surfaces to be waterproofed shall be clean and free of form scale, mould, laitance, oil, form release agents, curing compounds, hardeners, and any other materials likely to affect the bond penetration or performance of the waterproofing materials.
2. Materials shall not be applied to frozen or frosted surfaces, nor during rain or snow.
3. The presence of moisture in the concrete substrates is essential at the time of the waterproofing application. Should this not be the case, soak thoroughly all surfaces with water a day prior to the waterproofing, and remove all free laying water.
4. All cracks in the concrete structure exceeding .01" in width and construction joints which have not been treated before with capillary waterproofing, shall be routed out to a minimum depth of 3/4".
5. Areas that have become dirty and concrete pours which have resulted in an extremely smooth surface shall be acid etched or, at the Contractor's option, may be sand blasted. Surfaces to be acid etched shall be dampened with clean water. Etching shall be done with a fifteen (15) percent hydrochloric (muriatic) acid. One gallon of acid should cover about fifty (50) to seventy-nine (79) square feet. Allow the acid to stand at least three (3) minutes and when bubbling ceases, flush off with water immediately. Do not let the acid stay on the surface for a prolonged period. When completed, the surface shall have a finish similar to fine or medium sandpaper. Surfaces which retain a smoothness or dirty condition shall be re-etched until the desired effect is obtained.
6. Fill Form: Tie holes with "Aqua-Fin Mortar" of mortar consistency.
7. Vertical Concrete Surfaces
  - a. Grind off all fins and other projections.
  - b. Extremely smooth surfaces must be etched or sand blasted.

- c. Form ties with insets shall be removed. Chip back concrete approximately one (1) inch where form ties are without insets.
- d. Honeycombed Pockets and Faulty Construction Joints: Rout out all faulty materials back to sound concrete; clean and rinse thoroughly with water all surfaces to be treated; check by rubbing hand over the surfaces. Hand should not become wet.

C. Mixing of Capillary Waterproofing Materials

- 1. Slurry Consistency: The capillary waterproofing materials shall be delivered in powder consistency in original undamaged containers with manufacturer's labels and seals intact.
  - a. Separate container shall be used for measuring by volume the powdery capillary waterproofing and the water.
  - b. Measure two (2) parts of capillary waterproofing and 0.7 - 0.9 parts of water (depending on water or absorption of concrete).
- 2. Mortar Consistency for Seal Strips and Coves
  - a. Add water to capillary waterproofing and/or capillary waterproofing reinforcing proportion 1:2 and/or 1:3 and mix thoroughly until stiff consistency is reached.
  - b. Prepare only as much mortar as can be applied within ten (10) minutes.

D. Installation of Capillary Waterproofing Materials

- 1. Slurry Application
  - a. Concrete surfaces to be treated with capillary waterproofing shall be moist, not wet.
  - b. Capillary waterproofing slurry coatings shall be applied with a stiff masonry brush or stiff broom and worked into every irregularity of the concrete surfaces.
  - c. Prior to the specified final application of capillary waterproofing slurry coatings on the concrete surface, the following initial applications and repairs to the concrete structure have to be completed.
- 2. Construction Joints
  - a. Construction joints shall receive a slurry coating of capillary waterproofing 2.5 lbs. per square yard immediately prior to each concrete pour. In areas where inaccessibility is difficult, apply 2.5 lbs. per square yard of capillary waterproofing by dry sprinkle method immediately prior to the following pour or rout out to a minimum depth of 3/4".
  - b. Apply slurry coating of capillary waterproofing 1.5 lbs. per square yard to routed out areas of cracks and construction joints and fill remaining depth with capillary waterproofing and capillary waterproofing reinforcing 1:6 in mortar consistency in two (2) laminating layers after each layer has reached its initial set (approximately 20-30 minutes).

3. Installation of Capillary Waterproofing Coves (Junction Horizontal Surfaces and Walls): Apply slurry coating of capillary waterproofing 1.5 - 2.0 lbs. per square yard, six (6) inches in width, and install a cove with capillary waterproofing and capillary waterproofing reinforcing 1:3 in mortar consistency.
4. Honeycombed Pockets in Wall Areas: Rout out all faulty materials back to sound concrete. Apply slurry coating of capillary waterproofing 1.5 lbs. per square yard over routed out area and fill with sand and cement mortar 1:3. If necessary (owing to depth) apply layers of mortar not exceeding 5/8" in thickness after each layer has hardened and repeat capillary waterproofing slurry coating.
5. Pit Walls - Interior Face
  - a. Moisture treat vertical concrete surfaces thoroughly one day prior to application. Construction joints and form tie holes shall be filled with capillary waterproofing and capillary waterproofing reinforcing 1:6 in mortar consistency.
  - b. Apply two (2) slurry coatings on entire surface, consisting of "Aqua-Fin IC" capillary waterproofing 1.25 lbs. per square yard per coating, to levels and on surfaces indicated. The second coating shall be applied while the first coating is green, normally within an hour of the application of first coating.
6. Concrete Slabs – Pits: Apply Aqua-Fin IC at the rate of 2.5 lbs./sq. yd. in slurry consistency to concrete slab surfaces in one coat.

E. Curing of Capillary Waterproofing Application

1. Capillary waterproofing applications while setting shall be protected from rain, frost and from drying out. During extreme hot weather, light water fog spraying may be necessary during time of application.
2. Moisture treat capillary waterproofing treated areas for minimum period of three (3) days starting the day following the completion of the capillary waterproofing application with fog water spray. Surfaces shall have moist and later wet appearance for the duration of the curing period.
3. Treated surfaces shall not be exposed to aggressive water, chemicals or acids until the applications have reached full strength (normally after 14 days).

END OF SECTION

## SECTION 075500

### MODIFIED BITUMEN ROOFING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the modified bitumen roofing as shown on the drawings and/or specified herein, including but not limited to, the following:

1. APP modified bitumen roof membrane – for new and existing roof work.
2. Roof insulation.
3. Base flashing.
4. Accessories.
5. Removal of existing roof system and associated metal flashing.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Selective demolition and alteration work - Section 024119.
- F. Wood blocking - Section 062000.
- G. Flashing and sheet metal - Section 076200.
- H. Roof accessories - Section 077100.
- I. Roof drains - Division 23.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in

the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. Membrane roofing shall have a Solar Reflective Index (SRI) equal to or greater than 78 for low-sloped roofs (slope  $\leq$  2:12), and/or equal to or greater than 29 for steeped sloped roofs (Slope  $\geq$  2:12) when tested in accordance with ASTM E 1980.
  2. Materials in this section harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable. As per Section 018419, sealants used as filler shall not exceed 250 grams per liter.
  4. Certification of these products shall be in accordance with the Submittal Requirements of this Section.
- C. Manufacturer Qualifications: Obtain primary roofing products, including roofing sheets (felts), bitumen, composition flashings, and vapor barrier from a single manufacturer. Provide secondary materials as recommended by manufacturer of primary materials.
- D. Special Experience Requirements
1. Installer: The contractor or subcontractor performing the work of this Section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.
  2. Obtain written certification from manufacturer of roofing stating that installer is an approved applicator of roofing system.
- E. Pre-Roofing Conference: Prior to installation of roofing and associated work, meet at project site, or other mutually agreed location, with Installer, roofing manufacturer, installers of related work, Contractor and other entities concerned with roofing performance, including the Commissioner and the City of New York. Record discussions and agreements and furnish copy to each participant. Provide at least seventy-two (72) hours' advance notice to participants prior to convening pre-roofing conference. Review methods and procedures related to roofing work, including but not limited to the following:

1. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
  2. Review roofing system requirements (drawings, specifications and other Contract Documents).
  3. Review required submittals, both completed and yet to be completed.
  4. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
  5. Review required inspection, testing, certifying and material usage accounting procedures.
  6. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
- F. UL Listing: Provide labeled materials which have been tested and listed by UL in "Building Materials Directory" for application indicated, with "Class A" rated materials/system for roof slopes shown.
1. Provide roof covering materials bearing Classification Marking (UL) on bundle, package or container indicating that materials have been produced under UL's Classification and follow-up Service.
- G. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction:
1. Surface Burning Characteristics: ASTM E 84.
  2. Fire Resistance Rating: ASTM E 119.
  3. Combustibility Characteristics: ASTM E 136.
- H. Provide roofing system and component materials which have been evaluated by Factory Mutual System for fire spread, wind-uplift Class 90, and hail damage and are listed in "Factory Mutual Approval Guide" for Class I construction. System shall also meet ASCE-7 for wind uplift standards.
1. Provide roof covering materials bearing FM approval marking on bundle, package or container, indicating that material has been subjected to FM's examination and follow-up inspection service.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements the contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits.
  5. Certification from the manufacturer that the product has achieved a Solar Reflective Index (SRI) equal to or greater than 78 for low-sloped roofs (slope  $\leq$  2:12), and/or equal to or greater than 29 for steeped sloped roofs (Slope  $\geq$  2:12) when tested in accordance with ASTM E 1980.
- B. Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.
- C. Pre-Roofing Conference: Submit copies of pre-roofing conference records.
- 1.6 JOB CONDITIONS
- A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.
- 1.7 PRODUCT HANDLING
- A. Store and handle roofing sheets in a manner which will ensure that there is no possibility of significant moisture pick-up.
- B. Store in a dry, well ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing

work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

## 1.8 WARRANTY

- A. Current warranty must be maintained/renewed after adjustments are made to the roofing under this contract.
- B. Special Project Warranty: Provide written warranty, signed by Manufacturer of primary roofing materials and his authorized Installer, agreeing to replace/repair defective materials and workmanship as required to maintain roofing system in watertight condition.
- C. Warranty period for manufacturer is twenty (20) years after date of Substantial Completion; no dollar limit.
- D. Warranty period for installer is two (2) years after date of Substantial Completion; no dollar limit.

## PART 2 PRODUCTS

### 2.1 ROOFING SYSTEM

- A. Roofing system to be a multiple layer, APP modified bitumen (polyester reinforced), granule surfaced, equal to GTA-FR-C-B3, CertainTeed Flintastic GTA-FR with CoolStar, or approved equal by Johns Manville, Siplast or approved equal.

### 2.2 ROOF INSULATION

- A. Polyisocyanurate Board Roof Insulation: Rigid, sloped (1/4" per foot) and flat, cellular thermal insulation with polyisocyanurate closed-cell foam core and manufacturer's standard facing laminated to both sides; complying with ASTM C 1289, average LTTR value as designated at mean temperatures indicated, after testing per ASTM C 1303 as follows:
  - 1. Surface Burning Characteristics: Maximum flame spread of 25.
  - 2. LTTR R-Value: 6.0/inch at 75 deg. F.
- B. Acceptable Product/Manufacturer: "Enrgy 3" as manufactured by Johns Manville, or equal made by Apache or Hunter.
  - 1. Roof membrane manufacturer must approve insulation in writing.
  - 2. Cover insulation with 3/4" thick Perlite board equal to "Fesco" as manufactured by Johns Manville, or approved equal.

### 2.3 MODIFIED BITUMINOUS BASE FLASHING

- A. Provide modified bituminous base flashing system as determined by edge details and that is acceptable to roofing manufacturer.

## 2.4 CANT STRIPS

- A. Provide cant strips formed of rigid insulation matching roof insulation or molded asphalt or coal tar impregnated organic fiber insulation material, 45° cant, unless otherwise indicated.

## 2.5 MISCELLANEOUS MATERIALS

- A. Lead flashing sheet of 4 lb. flashing lead for pipe flashing of common desilverized pig lead.
- B. FM approved mechanical fasteners for attaching insulation to deck.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where modified bituminous roofing is to be installed for compliance with requirements. Report conditions detrimental to roofing work. Proceed after unsatisfactory conditions are corrected to permit proper installation of the work.
- B. Clean substrate of dust, debris, and other substances detrimental to roofing work. Remove sharp projections.

### 3.2 REMOVAL OF EXISTING ROOFING

- A. Removal of existing roofing consists of removal of entire roof system including roof membrane, insulation, base flashing, cap flashings and all metal flashings associated with roof construction.
- B. All work shall conform to the requirements of Section 024119, Selective Demolition and Alteration Work.
- C. Provide all required covers and protective devices as necessary to keep water from penetrating into the structure due to roof removal. Be responsible for any damage caused by lack of such protection.
- D. Clean existing concrete deck prior to installation of new roof system so that it meets with the approval of roof membrane manufacturer. Obtain such approval in writing and submit copy of same to the Commissioner.

### 3.3 INSTALLATION, GENERAL

- A. Install built-up roofing in accordance with manufacturer's recommendations and requirements of authorities having jurisdiction.
- B. Substrate shall be clean, smooth and dry, free of projections which might puncture the felts.
- C. Insure that all drains, curbs, blocking and roof penetrating components are in place before any roofing work starts. See that all roof drains are set 1" below the normal

finish roof level to insure that additional flashing around the drains will not be built-up above the normal roof level and prevent proper drainage.

- D. Install flashing, including counterflashing, as roof application progresses. If delay is unavoidable, trowel the top of the flashing with flashing cement close to the joint to prevent water from entering behind the flashing until the counterflashing is in place.
- E. Start roofing application at far points of the deck and work toward area where base materials are fastened to the roof deck (to minimize traffic over newly applied roofing).
- F. Weigh down all membrane edges left incomplete before splicing with other sections of membrane.
- G. Prohibit phased application in which saturated felts are left exposed overnight or longer before top plies and topcoat are applied. Place aggregate surface on same day as felts.
- H. Inspect roof drains for obstructions and debris after the roofing work is completed.
- I. Prime deck as recommended by roof membrane manufacturer.

#### 3.4 INSULATION

- A. Extend insulation and Perlite board full thickness over entire surface to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation and mastic.
- B. Apply a double layer of insulation of the required thickness, to make up the total thickness. Stagger joints between layers as recommended by the manufacturer.
- C. Set first layer of insulation using mechanical fasteners spaced in accordance with FM requirements to meet I-90 wind uplift. Apply second layer of insulation cold fluid-applied adhesive.
- D. Do not advance the laying of insulation ahead of roofing more than necessary for sequence of operations. Cover insulation exposed at end of each day's work (and when rain threatens) with waterproofing materials. Do not permit insulation to become wet. Remove and dispose of insulation which has become wet; replace before proceeding with roofing work.
- E. Lay with edges in moderate contact but do not force into place.
- F. Stagger end joints; or tape joints where recommended by the manufacturer.
- G. Install temporary water cut-offs at completion of each day's work and remove upon resumption of work.

#### 3.5 ROOFING

- A. Shingling of Plies: Lay plied bituminous membranes over insulation with felts shingled uniformly to achieve the required plies in accordance with manufacturer's instructions.

- B. Set on Accessories: Where small roof accessories are set on built-up roofing membrane, set metal flanges in a bed of roofing cement, and seal penetration of membrane with bead of roofing cement to prevent flow of bitumen from membrane.

### 3.6 COMPOSITION FLASHING AND STRIPPING

- A. Provide composition flashing at cant strips and other sloping and vertical surfaces, and at roof edges, and at penetrations through roof. Nail or provide other forms of mechanical anchorage of composition flashing to vertical surfaces, as recommended by manufacturer of primary roofing materials. Except where concealed by elastic flashing, apply a heavy coating of roofing cement over composition flashing.

### 3.7 ROOF DRAINS

- A. Install 1-1/2" x 18" Tapered Edge Strips to form a gradually tapered sump transition from top of insulation to roof drain flange. Minimum sump size to be 4 ft. by 4 ft.
- B. Install roofing plies, starting at the low point (roof drain) in a shingle fashion so that four plies are provided, trimming felt plies at edge of drain flange.
- C. Install a 4# lead flashing (minimum size 30" x 30"), set in bed of flashing cement, on top of roofing plies. Form lead to shape of sump and into drain bowl, trimming neatly approx. 1" beyond ring. Install clamping ring immediately.
- D. Strip in lead with one ply of SBS Modified Bitumen membrane, extending from clamping ring out a minimum of 6" beyond lead; using modified bitumen trowel grade flashing cement.

### 3.8 CLEANING UP

- A. Take special care to prevent splashing adhesive onto adjacent surfaces, and immediately remove all traces of such splashed and/or spilled material.

END OF SECTION

## SECTION 076200

### SHEET METAL WORK

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet metal work, as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Field fabricating (including bending, cutting, soldering, etc.), if required, of stainless steel flashing.
  - 2. Stainless steel flashing elsewhere, where metal flashing is indicated on drawings.
  - 3. Separation of contacting surfaces of dissimilar metals.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Unit masonry – Section 042000.
- F. Roofing - Section 075300.

##### 1.4 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.

- b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
  - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Shop Drawings: Submit, showing all materials, finishes, fastenings, joint details, fabrication, construction and relation to adjoining construction.
- C. Samples: Submit 12" x 12" samples of flashing materials and finishes.

#### 1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.

3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.

#### 1.6 WARRANTY

- A. The Contractor shall warrant that all Metal Flashing Work executed under this Section will be free from defects in materials and workmanship for a period of two (2) years from date of acceptance of the Project, and he shall remedy any defects in the Metal Flashing Work.

#### 1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the City of New York.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Stainless Steel Flashing Materials
  1. Stainless Steel Flashing: ASTM A167, Type 304, stainless steel, with 2D finish, dead soft temper, fully annealed, as manufactured by International Nickel Co., Republic Steel Corp., United States Steel, or Washington Steel Corp. Thickness of stainless steel shall be 26 ga.
  2. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel.
  3. Solder: Composed of sixty (60) percent block tin and forty (40) percent pig lead, except that solder at seams exposed to public view shall be eighty (80) percent tin and twenty (20) percent lead.
  4. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where sheet metal work is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 METAL FLASHING INSTALLATION

- A. Reference Standard: Conform to the requirements of 5<sup>th</sup> Edition of the Sheet Metal and Air Conditioning Contractors Association (SMACNA) Architectural Sheet Metal Manual.
- B. General: Fabricate and install metal flashing work in accordance with details and specifications of above Reference Standard, with manufacturer's instructions, and as herein specified, to provide a watertight installation. Apply metal flashing to smooth, even, sound, clean, dry surfaces free from defects. Make provisions to allow for expansion and contraction of metal flashing work. Wherever practicable, shop form all metal flashing work and deliver ready for installation. Form metal flashing work accurately to required profiles, with flat surfaces, straight edges and corners, free from defects. Fold exposed metal edges back not less than 1/2" and form drip.
- C. Nailing: Confine to sheets twelve (12) inches or less in width. Confine nailing to one edge only, locate nails where concealed. Use No. 12 x 1" long flat headed, annular threaded, Type 302 stainless steel nails for nailing to wood blocking; use one (1) inch long masonry nails for nailing to concrete. Space nails four (4) inches o.c. maximum.
- D. Cleating: Use cleats where sheets are more than twelve (12) inches in width. Space cleats approximately twelve (12) inches o.c.. Cleats two (2) inches wide by three (3) inches long, of the same material and weight as the metal flashing being installed. Secure one end of the cleat with two (2) nails and fold edge back over the nail heads. Lock other end into seam or into folded edge of metal flashing sheets. Pre-tin cleats for soldered seams.
- E. Joining: Join metal flashings with one (1) inch locked and soldered seams except at slip joints. Mallet seams flat and solder full length of seam as specified below.
- F. Soldering: Mechanically clean all metal surfaces to be soldered with steel wool. Clean and pre-tin edges of metal flashing to be soldered before soldering is begun with solder on both sides for a width of not less than 1-1/2". Solder slowly with well heated metal surfaces. Use ample solder. Show not less than one full inch of evenly flowed solder on seam. Seams shall have a liberal amount of flux brushed in before soldering is commenced. Where soldering paste or killed acid is employed as a flux, soldering shall follow immediately after application of the flux. Upon completion of soldering, clean surfaces of all flux.

- G. Slip Joints: Locate slip joints not more than twenty four (24) feet apart and within 2' of corners and changes in direction. Form slip joints as three (3) inch wide joints with cover piece behind flashing, and fill locked ends neatly with sealant.
- H. Miscellaneous Flashing: Provide all other miscellaneous metal flashing not specifically mentioned herein, but indicated on drawings and/or required to provide a watertight installation.
- I. Separation of Dissimilar Materials: Back paint surfaces of metal flashing in contact with dissimilar metals or with concrete or masonry with bituminous paint.

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## SECTION 077100

### ROOF SPECIALTIES AND ACCESSORIES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the roof specialties and accessories as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  1. Roof smoke vents.
  2. Venting skylights for fire stairs.
  3. Penthouse elevators vents.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Roofing - Section 075300.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

## 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications.
  2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Before any roof specialties and accessories are delivered to the job site, submit shop drawings showing profiles and anchoring devices.

## 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## PART 2 PRODUCTS

### 2.1 SMOKE VENTS

- A. Provide shop primed galvanized steel heat and smoke vent units of sizes shown on drawings, with 1" rigid insulation at curbs and door, standard lifting mechanism and automatic heat and smoke sensitive release devices. Provide manufacturer's standard hardware including hold-open device, hinges, latch and operating handles for inside and outside operation.

- B. Provide Type DSH Automatic Roof Fire Vents by Bilco, or equivalent product by Babcock-Davis, Milcor or approved equal.

## 2.2 VENTING SKYLIGHT AT FIRE STAIRS

- A. Provide standard or custom curb-mounted, aluminum-framed skylight to meet requirements indicated below.
- B. Provide skylight which complies with the requirements of the New York City Building Code, Section 27-344 Skylights shall be at least twenty square feet in area, glazed with plain glass with a wire screen over and under, and provided with fixed or movable ventilators having a minimum open area of 144 sq. in.
- C. Dimensions of skylights shall be as indicated on drawings.
- D. Insulating Glass: Clear, sealed units as follows:
  - 1. Glazing Unit Composition: 1" insulating glass consisting of 1/4" clear tempered glass exterior lite; 1/2" air space, and 1/4" clear tempered glass interior lite.
- E. Operable Unit Skylight System: Equip vent-type unit skylights with manufacturer's standard hinges, chain-driven operating hardware, and weather-sealing gaskets.
- F. Protective Screens: Manufacturer's standard.
- G. Aluminum shall have clear anodized (A-41) finish.

## 2.3 PENTHOUSE ELEVATOR VENTS

- A. Provide gravity ventilator comprised of three sides of standard stationary non-drainable louver Model ESJ-401, along with one side of 1/8 in. thick plate glass that can be broken with the pressure of a fire hose. A fire smoke damper, model SMD-202, shall be located in the throat of the curb and wired into the fire control panel. The unit shall be shop assembled and shipped complete.
- B. Provide PEV-400 Penthouse Elevator Vent by Greenheck, or equivalent product by Ruskin, United Enertech Corp., or approved equal.
  - 1. 12" high curb.
  - 2. Stainless steel bird screen
  - 3. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
    - a. Fluoropolymer Three-Coat System: Manufacturer's standard three-coat, thermo-cured system consisting of specially formulated inhibitive primer and fluoropolymer color coat and clear topcoat containing not less than 70

percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-02.

- b. Custom color and gloss as selected by the Architect.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where roof specialties and accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- B. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- C. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- D. Operational Units: Test operational units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.
- E. Roof Expansion Joint:
  - 1. Provide uniform profile throughout the length of the installation, and do not stretch the elastic sheet.
  - 2. Nail metal flanges to curbs and cant strips securely as recommended by the manufacturer for waterproof construction.
  - 3. Anchor edges of expansion joint units in the manner indicated, complying with manufacturer's instructions. Provide not less than 4" embedment in bituminous membranes, with hot bitumen or with roofing cement. Cover with composition stripping as specified for the membrane work.

3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

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## SECTION 078100

### SPRAYED FIRE-RESISTIVE MATERIALS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the sprayed fire-resistive materials as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Spray-on fireproofing for structural steel and metal decking.
  - 2. Seal coat over fireproofing in special areas.
  - 3. Preparation of surfaces.
  - 4. Field quality control.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Structural steel - Section 051200.
- F. Firestops and smoke seals - Section 078413.

##### 1.4 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 –1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications.
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.

- b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  3. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Product Data: For each fire-resistive product specified.
- C. Shop Drawings: Submit structural framing plans indicating the following:
  1. Locations and types of surface preparations required before applying sprayed fire-resistive material.
  2. Extent of sprayed fire-resistive material for each construction and fire-resistance rating, including the following:
    - a. Applicable fire-resistive design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
    - b. Minimum thicknesses needed to achieve required fire-resistance ratings of structural components and assemblies.
- D. Product Certificates: Signed by manufacturer of sprayed fire-resistive material certifying that the products furnished comply with requirements.
- E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- G. If primer is to be used steel and/or metal deck, submit certifications by supplier of primer that primer is compatible with materials, and will not impair the required performance of the installed fireproofing. Such certification shall be accompanied by evidence that the primer was successfully used in conjunction with the fireproofing material in a UL test applicable to the construction. Submit his certification prior to application of primer.

1. Coordinate with Section 051200, "Structural Steel," and Structural Drawings prior to application of primer.
- H. Product Test Reports: Indicate that physical properties of proposed sprayed fire-resistive materials comply with specified requirements based on comprehensive testing of current product formulations by a qualified testing and inspecting agency according to requirements specified in "Quality Assurance" Article.
- I. Code Compliance: Proposed product must comply with prevailing Building Code and be approved by those individual having jurisdiction.

#### 1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  1. Applied fire-resistive materials shall contain recycled content as follows:
    - a. Cementitious and/or fibrous fireproofing shall contain a minimum of 15% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
    - b. Metal lath and reinforcing fabric shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content.
    - c. Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Applied Fire resistive materials harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable. As per Section 018419, sealants shall not exceed 250 grams per liter.
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by sprayed fire-resistive material manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its sprayed fire-resistive

materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.

- D. Submit data indicating that products containing no detectable asbestos as determined according to the method specified in 40 CFR, Part 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."
- E. Mockups: After processing of initial submittals and before delivery and installation of fireproofing materials, prepare a sample installation of fireproofing work, approximately 100 sq. ft. in area; providing an example of each type required, applied on each different substrate, to produce each different rating as required and reasonably representative of entire sprayed on fireproofing work, for joint approval by representative of fire resistant material manufacturer and the City of New York. Work in other areas shall not proceed until mock-up has been completed. Mock-up work which remains in compliance with requirements and is in undamaged and acceptable condition may be retained as final work in place.
- F. Material used in New York City must have BSA approval.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; shelf life, if applicable; and fire-resistance ratings applicable to Project.
- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, aboveground, so they are kept dry until ready for use. Remove from Project site and discard materials that have deteriorated.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply sprayed fire-resistive material when ambient or substrate temperatures are 40 deg F. or lower, unless temporary protection and heat is provided to maintain temperatures at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of sprayed fire-resistive material to achieve a minimum of four air changes per hour. Use natural means or, where this is inadequate, forced-air circulation until fire-resistive material dries thoroughly.

#### 1.8 SEQUENCING

- A. Sequence and coordinate application of sprayed fire-resistive materials with other related work specified in other Sections to comply with the following requirements:
  - 1. Provide temporary enclosures for interior applications to prevent deterioration of fire-resistive material due to exposure to unfavorable environmental conditions.

2. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
3. Do not apply fire-resistive material to metal roof deck substrates until roofing has been completed; prohibit roof traffic during application and drying of fire-resistive material. Fireproofing shall be considered dry when the moisture content is 6% or less.
4. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
5. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
6. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, tested, and corrections have been made to defective applications.
7. Protect permanently exposed walls, floor or special surfaces.

#### 1.9 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the City of New York of other rights the City of New York may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty, executed by Contractor and cosigned by Installer, agreeing to repair or replace sprayed fire-resistive materials that fail within the specified warranty period.
  1. Failures include, but are not limited to, cracking, flaking, eroding in excess of specified requirements; peeling; and delaminating of sprayed fire-resistive materials from substrates due to defective materials and workmanship within the specified warranty period.
  2. Not covered under the warranty are failures due to damage by occupants and the City of New York's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and other causes not reasonably foreseeable under conditions of normal use.
- C. Warranty Period: Three (3) years from date of Substantial Completion.

### PART 2 PRODUCTS

#### 2.1 CONCEALED SPRAYED FIRE-RESISTIVE MATERIALS

- A. General: For concealed applications of sprayed fire-resistive materials, provide manufacturer's standard products complying with requirements indicated in this Article for material composition and physical properties representative of installed products.

B. Material Composition: As follows:

1. Cementitious sprayed fire-resistive material consisting of factory-mixed, dry formulation of gypsum or Portland cement binders and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.

C. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property listed as follows:

1. Dry Density: Minimum 15 lb./cu. ft. for average and individual densities regardless of density indicated in referenced fire-resistive design, or greater if required to attain fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination."
2. Thickness: Provide minimum average thickness required for fire-resistive design shown on approved submittals.
  - a. Fireproofing shall be of thicknesses and density to meet the requirements of the New York City Building Code for type of construction indicated for the Project.
3. Bond Strength: Not less than 200 lbf/sq. ft. per ASTM E 736.
4. Compressive Strength: 5.21 lbf/sq. in. as determined in the laboratory per ASTM E 761. Minimum thickness of sprayed fire-resistive material tested shall be 0.75 inch and minimum dry density shall be as specified, but not less than 15 lb./cu. ft.
5. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
6. Deflection: No cracking, spalling, delamination, or the like per ASTM E 759.
7. Effect of Impact on Bonding: No cracking, spalling, delamination, or the like per ASTM E 760.
8. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours per ASTM E 859. For laboratory tests, minimum thickness of sprayed fire-resistive material is 0.75 inch, maximum dry density is 15 lb./cu. Ft., test specimens are not prepurged by mechanically induced air velocities, and tests are terminated after 24 hours.
9. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - a. Flame Spread: 10 or less.
  - b. Smoke Developed: 0.

10. Fungal Resistance: No observed growth on specimens per ASTM G 21.
- D. Products: Subject to compliance with requirements, provide products by one of the following:
1. Cementitious Sprayed Fire-Resistive Material
    - a. Pyrolite 5GP; Carbolite Co., Fireproofing Products Div.
    - b. Monokote Type MK-6; W.R. Grace & Co. - Conn., Construction Products Div.
    - c. Cafco 300; Isolatek International Corp., Cafco Products.
    - d. Type F3; Promat Firetemp.

## 2.2 EXPOSED SPRAYED FIRE-RESISTIVE MATERIALS

- A. General: For exposed applications of sprayed fire-resistive materials, provide manufacturer's standard products complying with requirements indicated for material composition and for minimum physical properties of each product listed, measured by standard test methods referenced with each property.
- B. Cementitious Sprayed Fire-Resistive Material: Factory-mixed, dry, cement aggregate formulation, chloride-free formulation of gypsum or Portland cement binders, additives, and inorganic aggregates, mixed with water at Project site to form a slurry or mortar for conveyance and application, complying with the following requirements:
1. Dry Density: Values for average and individual densities as required for fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination," but with an average density of not less than 22 lb./cu. ft.
  2. Bond Strength: 500 psf minimum per ASTM E 736.
  3. Compressive Strength: 10,000 psf. per ASTM E 761.
  4. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
  5. Deflection: No cracking, spalling, delamination, or the like per ASTM E 759.
  6. Effect of Impact on Bonding: No cracking, spalling, delamination, or the like per ASTM E 760.
  7. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. per ASTM E 859.
  8. Combustion Characteristics: Passes ASTM E 136.
  9. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
    - a. Flame Spread: 10 or less.
    - b. Smoke Developed: 0.

10. Fungal Resistance: No observed growth on specimens per ASTM G 21.
  11. For exterior applications of sprayed fire-resistive material, provide manufacturer's formulation approved for surfaces exposed to the exterior.
- C. Products: Subject to compliance with requirements, provide one of the following:
1. Cement-Aggregate Cementitious Sprayed Fire-Resistive Material:
    - a. Pyrocrete 239; Carbolite Co., Fireproofing Products Div.
    - b. Monokote Type Z106HY; W.R. Grace & Co.--Conn., Construction Products Div.
    - c. F4; Promat Firetemp.
    - d. Cafco 400, Isolatek International Corp; Cafco Products.

### 2.3 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary fire-resistive materials that are compatible with sprayed fire-resistive materials and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistive designs indicated.
- B. Adhesive for Bonding Fire-Resistive Material: Product approved by manufacturer of sprayed fire-resistive material, used where required by manufacturer to insure proper bond.
- C. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required to comply with fire-resistive designs indicated and fire-resistive product manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive sprayed fire-resistive material.
- D. Sealer for Sprayed Fire-Resistive Material in Elevator Shafts: Transparent-drying, water-dispersible protective coating by manufacturer of fire-resistive material.
1. Product: Subject to compliance with requirements, provide "Firebond Concentrate" by W.R. Grace, or similar product recommended by the manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, to determine whether they are in satisfactory condition to receive sprayed fire-resistive material. A substrate is in satisfactory condition if it complies with the following:
1. Substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt, or other foreign substances capable of impairing bond of fire-resistive material with substrate under conditions of normal use or fire exposure.

2. Objects penetrating fire-resistive material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
  3. Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire-resistive material.
- B. Do not proceed with installation of fire-resistive material until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of substances that could impair bond of fire-resistive material, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.
- B. For exposed applications, repair substrates to remove any surface imperfections that could affect uniformity of texture and thickness in finished surface of sprayed fire-resistive material. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.
- C. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and ensure maintenance of adequate ambient conditions for temperature and ventilation.

### 3.3 INSTALLATION

- A. Comply with fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to convey and spray on fire-resistive material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Install metal lath, as required, to comply with fire-resistance ratings and fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach lath to substrate in position required for support and reinforcement of fire-resistive material. Use anchorage devices of type recommended in writing by fire-resistive material manufacturer. Attach lathing accessories where indicated or required for secure attachment to substrate.
- C. Coat substrates with adhesive before applying fire-resistive material where required to achieve fire-resistance rating or as recommended in writing by fire-resistive material manufacturer for material and application indicated.
- D. Extend fire-resistive material in full thickness over entire area of each substrate to be protected.
- E. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by method recommended by the manufacturer.
- F. Where sealers are used, apply products that are tinted to differentiate them from the sprayed fire-resistive material over which they are applied.

- G. Maintain ambient conditions during installation and for cure period following installation, as recommended by manufacturer. Provide ventilation and avoid excessive rate of drying.
- H. Fireproofing to the underside of roof deck assemblies shall be done only after roofing application is complete, all roof mounted mechanical equipment is in place, and the roof is watertight.
- I. No fireproofing shall be applied prior to completion of concrete work on steel decking.
- J. Installation Sequence of Fireproofing: All patching and repairing of sprayed fireproofing, due to cutting by other trades or testing and inspection, shall be performed under this Section.
- K. Provisions shall be made for ventilation to properly dry the fireproofing after application. In enclosed areas lacking natural ventilation, air circulation and ventilation must be provided.

#### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: The City of New York will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
  - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing and inspecting of completed applications of sprayed fire-resistive material will take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of fire-resistive material for the next area until test results for previously completed applications of fire-resistive material show compliance with requirements.
  - 1. For each 1000-sq. ft. area, or partial area, on each floor, testing and inspecting agency will evaluate the following characteristics. Tested values must equal or exceed values indicated and values required for approved fire-resistance design.
    - a. Thickness for Floors, Roofs, and Walls: From the average of 10 measurements from a 144-sq. in. sample area, with sample width of not less than 6 inches per ASTM E 605.
  - 2. Thickness for Structural Frame Members: From a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single cross section for joists and trusses, and 12 measurements of a single cross section for columns per ASTM E 605.
  - 3. For each 10,000 sq. ft. area, or partial area, on each floor, testing and inspection agency will evaluate the following characteristics. Tested values must equal or exceed values indicated and values required for approved fire resistance design.

- a. Bond Strength for Floors, Roofs, Walls, and Structural Framing Members: Cohesion and adhesion at frequency and from sample size indicated for determining thickness of each type of construction, per ASTM E 736.
- 4. Density for Floors, Roofs, Walls, and Structural Frame Members: At frequency and from sample size indicated for determining thickness of each type of construction, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination."
- 5. When testing discovers applications of fire-resistive material not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.
- C. Remove and replace applications of fire-resistive material where test results indicate that they do not comply with specified requirements for cohesion and adhesion or for density, or both.
- D. Apply additional fire-resistive material per manufacturer's written instructions where test results indicate that thickness does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.5 CLEANING, PROTECTING, AND REPAIR

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Cure exposed sprayed fire-resistive material according to product manufacturer's written recommendations to prevent premature drying.
- C. Protect fire-resistive material, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so fire protection will be without damage or deterioration at the time of Substantial Completion.
- D. Coordinate application of fire-resistive material with other construction to minimize the need to cut or remove fire protection. As installation of other construction proceeds, inspect fire-resistive material and patch any damaged or removed areas.
  - 1. Patch and repair fireproofing where the City of New York's Testing Agency has performed tests.
- E. Repair or replace work that has not been successfully protected.

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## SECTION 078413

### FIRESTOPS AND SMOKESEALS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the firestops and smoke seals as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
  - 2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
  - 3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
  - 4. Sealant joints in fire-resistance-rated construction.
  - 5. Penetrations at each floor level in shafts and/or stairwells.
  - 6. Construction joints, including those between top of fire rated walls and underside of floors above.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Cast-in-place concrete - Section 033000.
- F. Unit masonry - Section 042000.
- G. Joint sealers - Section 079200.

- H. Drywall - Section 092900.
- I. Piping penetrations - Division 22.
- J. Duct penetrations – Division 23.
- K. Cable and conduit penetrations - Division 26.

#### 1.4 REFERENCES

- A. ASTM E 814 "Standard Method of Fire Tests of Through-Penetration Firestops."
- B. UL 1479, UBC 7-5 (Both are same as A. above).
- C. ASTM E 119 "Standard Method of Fire Tests of Building Construction and Materials."
- D. UL 263, UBC 7-1 (Both are same as C. above).
- E. UL 2079 "Tests For Fire Resistance of Building Joint Systems."
- F. ASTM E 1399 "Test For Dynamic Movement Conditions."
- G. ASTM E 1966 (Same as E. above).
- H. Published Through-Penetration Systems by recognized independent testing agencies.
  - 1. UL Fire Resistance Directory, Volume II of current year.
  - 2. Warnock Hersey Certification Listings, current year.
  - 3. Omega Point Laboratories, current year.
- I. Material must have BSA and/or MEA approval for use in New York City.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Submit manufacturer's product literature for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance, limitation criteria, test data and indication that products comply with specified requirements.
  - C. Submit shop drawings detailing materials, installation methods, and relationships to adjoining construction for each firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspection agency evidencing compliance with requirements for each condition indicated.
    1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.
  - D. Material Safety Data Sheets: Submit MSDS for each firestop product.
  - E. Submit qualifications of firestop installer, including letter from firestop manufacturer of products proposed to be installed, wherein manufacturer approves or recognizes as trained/ or certifies installer for installation of that manufacturer's products.
  - F. Manufacturer's Letters: For installations or configurations not covered by a UL or Warnock Hersey design number, a recommendation shall be obtained from the manufacturer, in writing, for the specific application.

#### 1.6 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  - 1. Materials in this section harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section..
  - 2. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING)", where applicable. As per Section 018419, sealants used as filler shall not exceed 250 grams per liter..
  - 3. Certification of these products shall be in accordance with the Submittal Requirements of this Section.
- C. General: Provide firestopping systems that are produced and installed to resist the spread of fire, and the passage of smoke and other gases.
- D. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by local building code and as tested by nationally accepted test agencies per ASTM E 814 or UL 1479. The F rating must be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated. T rating, when required by code authority, shall be based on measurement of the temperature rise on the penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
- E. Firestopping products shall be asbestos free and free of any PCBs.
- F. Do not use any product containing solvents or that requires hazardous waste disposal.
- G. Do not use firestop products which after curing, dissolve in water.
- H. Do not use firestop products that contain ceramic fibers.
- I. Firestopping Installer Qualifications: Firestop application shall be performed by a single firestopping contractor who specializes in the installation of firestop systems, whose personnel to be utilized have received specific training and certification or approval from the proposed respective firestop manufacturer, and firestop installer shall have a minimum of three years experience (under present company name) installing firestop systems of the type herein specified.
- J. Mock-Up: Prepare job site mock-ups of each typical Firestop System proposed for use in the project. Approved mock-ups will be left in place as part of the finished project and will constitute the quality standard for the remaining work.
- K. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
  - 2. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of

supporting the floor loads involved either by installing floor plates or by other means.

3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original unopened containers with manufacturer's name, product identification, lot numbers, UL or Warnock Hersey labels, and mixing and installation instructions, as applicable.
- B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.
- C. All firestop materials shall be installed prior to expiration of shelf life.

#### 1.8 PROJECT CONDITIONS

- A. Verify existing conditions and substrates before starting work
- B. Do not use materials that contain solvents, show sign of damage or are beyond their shelf life.
- C. During installation, provide masking and drop cloths as needed to prevent firestopping products from contaminating any adjacent surfaces.
- D. Conform to ventilation requirements if required by manufacturer's installation instructions or Material Safety Data Sheet.
- E. Weather Conditions: Do not proceed with installation of firestop products when temperatures are in excess or below the manufacturer's recommendations.
- F. Schedule installation of firestop products after completion of penetrating item installation but prior to covering or concealing of openings.
- G. Coordinate this work as required with work of other trades.

#### 1.9 SEQUENCING AND SCHEDULING

- A. Pre-Installation Conference: Convene a pre-installation conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
- B. Sequence: Perform work of this and other sections in proper sequence to prevent damage to the firestop systems and to ensure that their installation will occur prior to enclosing or concealing work.
- C. Install all firestop systems after voids and joints are prepared sufficiently to accept the applicable firestop system.
- D. Do not cover firestop systems until they have been properly inspected and accepted by the authority having jurisdiction.

## PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following manufacturers:
1. Tremco
  2. Bio-Fireshield
  3. 3M
  4. Specified Technologies Inc.
  5. U.S. Gypsum Co.
  6. Nelson
  7. Hilti, Inc.
  8. Grace Flame Safe

### 2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:
1. Permanent forming/damming/backing materials including the following:
    - a. Semirefractory fiber (mineral wool) insulation.
    - b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Joint fillers for joint sealants.
  2. Temporary forming materials.
  3. Substrate primers.
  4. Collars.
  5. Steel sleeves.
- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

- D. Smoke seals at top of partitions shall be flexible to allow for partition deflection.

## 2.3 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.
- B. Intumescent, Latex Sealant: Single-component, Intumescent, latex formulation.
- C. Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
- D. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum or polyethylene foil on one side.
- E. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.
- F. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- G. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- H. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, non-shrinking foam.
- I. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless firestop system limits use to non-sag grade for both opening conditions.

## 2.4 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.
  - 1. Sealant Colors: Color of exposed joint sealants as selected by the Commissioner.
- B. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.

1. Additional Movement Capability: Provide sealant with the capability to withstand 33 percent movement in both extension and compression for a total of 66 percent movement.
- C. Multi-Component, Non-Sag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.
1. Additional Movement Capability: Provide sealant with the capability to withstand 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated.
- D. Single-Component, Non-Sag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.
- 2.5 MINERAL FIBER/CERAMIC WOOL NON-COMBUSTIBLE INSULATION (FIRE SAFING)
- A. Provide min. 4 pcf Thermafiber as manufactured by Thermafiber Co., min. 4 pcf FBX Safing Insulation as manufactured by Fibrex, or approved equal to suit conditions and to comply with fire resistance and firestop manufacturer's requirements.
  - B. Material shall be classified non-combustible per ASTM E 119.
- 2.6 MIXING
- A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions with Installer present, for compliance with requirements for opening configuration, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
  1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
  3. Remove laitance and form release agents from concrete.
- B. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

### 3.3 CONDITIONS REQUIRING FIRESTOPPING

#### A. Interior Walls and Partitions

1. Construction joints between top of fire rated walls and underside of floors above, shall be firestopped.
2. Firestop system installed shall have been tested by either UL or Omega Point, including exposure to hose stream test and including for use with steel fluted deck floor assemblies.
3. Firestop system used shall allow for deflection of floor above.

#### B. Penetrations

1. Penetrations include conduit, cable, wire, pipe, duct, or other elements which pass through one or both outer surfaces of a fire rated floor, wall, or partition.
2. Except for floors on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, provide firestopping to fill such spaces in accordance with ASTM E 814.
3. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall of opening.

- C. Provide firestopping to fill miscellaneous voids and openings in fire rated construction in a manner essentially the same as specified herein before.

### 3.4 INSTALLING THROUGH PENETRATION FIRESTOPS

- A. General: Comply with the through penetrations firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through penetration firestop systems by proven techniques to produce the following results:
  - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.5 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool no sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

### 3.6 INSTALLING FIRESAFING INSULATION

- A. Install fire safing insulation utilizing welded or screw applied galvanized steel impaling pins and retaining clips; space clips or pins 24" o.c. maximum.
- B. Completely fill voids in areas where safing insulation is required. At spandrel conditions/floor edges, depth of insulation top to bottom shall be at least four (4) inches.
- C. Cover top of all safing insulation with firestop sealant or spray.

3.7 FIELD QUALITY CONTROL

- A. Inspecting agency employed and paid by the City of New York will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.
- B. Inspecting agency will report observations promptly and in writing to Contractor, City of New York and Commissioner.
- C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.
- D. Where deficiencies are found, Contractor must repair or replace firestopping so that it complies with requirements.

3.8 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to product firestopping complying with specified requirements.

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SECTION 079200

JOINT SEALERS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the joint sealers work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Exterior wall joints not specified to be sealed in other Sections of work.
  - 2. Interior wall joints not specified to be sealed in other Sections of work, including caulking to fill between architectural woodwork and any wall, floor and/or ceiling imperfections.
  - 3. Control and expansion joints in walls.
  - 4. Joints at wall penetrations.
  - 5. Joints between items of equipment and other construction.
  - 6. All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018819.
- E. Roofing - Division 7.
- F. Firestop sealants – Section 078413.
- G. Glazing sealants - Section 088000.
- H. Sealant within drywall construction - Section 092900.

I. Sealant at tile work - Section 093000.

1.4 QUALITY ASSURANCE

A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:

1. Materials in this section harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section..
2. Adhesives or sealants used for work in this section shall meet the requirements of Section 01015: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING)", where applicable. As per Section 01115, sealants used as filler shall not exceed 250 grams per liter..
3. Certification of these products shall be in accordance with the Submittal Requirements of this Section.

C. Bay Area Air Resources Board Regulation 8, Rule 51, Bay Area Air Quality Management District, [www.baaqmd.gov](http://www.baaqmd.gov)

D. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and specially trained in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.

E. Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates according to the method in ASTM C 794 and C 1521 that is appropriate for the types of Project joints.

F. Perform testing per ASTM C 1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. No sealant work shall start until results of these tests have been submitted to the Commissioner and he has given his written approval to proceed with the work.

1.5 ENVIRONMENTALLY-PREFERABLE PRODUCT CRITERIA:

A. VOC Content

1. The volatile organic compound (VOC) content of sealants and sealant primers used in interior applications shall not exceed the limits defined in Regulation 8 (Organic Compounds), Rule 51 (Adhesive and Sealant Products) of the Bay Area

Air Quality Management District (BAAQMD), of the State of California. The VOC limits defined by BAAQMD (based on 5/2/01 amendments) are as follows. All VOC limits are defined in grams per liter, less exempt compounds.

Sealants:

Architectural.....250

Sealant Primers:

Architectural (Non-porous installation) ...250

Architectural (Porous installation).....775

Sealants, primers, and cleaners required for sealant installation must also comply with all local regulations controlling VOC content.

1.6 SUBMITTALS

A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
  - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
  - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
  - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

B. Shop Drawings: Submit shop drawings showing all joint conditions, indicating relation of adjacent materials, all sealant materials (sealant, bond breakers, backing, primers, etc.), and method of installation.

1. Submit joint sizing calculations certifying that movement capability of sealant is not being exceeded.
- C. Samples: Submit the following:
  1. Color samples of sealants, submit physical samples (not color chart).
  2. Sealant bond breaker and joint backing.
- D. Product Data: Submit manufacturer's technical information and installation instructions for:
  1. Sealant materials, indicating that material meets standards specified herein.
  2. Backing rods.
- E. Submit manufacturer's certification as required by Article 1.6 herein.
- F. Submit results of testing required in Article 1.4 herein.

#### 1.7 MANUFACTURER'S RESPONSIBILITY AND CERTIFICATION

- A. Contractor shall require sealant manufacturer to review the Project joint conditions and details for this Section of the work. Contractor shall submit to the Commissioner written certification from the sealant manufacturer that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vaportight seals (as applicable), and that materials supplied meet specified performance requirements.

#### 1.8 ENVIRONMENTAL CONDITIONS

- A. Temperature: Install all work of this Section when air temperature is above forty (40) degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.
- B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

#### 1.9 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section, before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.
- C. Storage
  1. Store sealant materials and equipment under conditions recommended by their manufacturer.

2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.
3. Material shall be stored in unopened containers with manufacturers' name, batch number and date when shelf life expires.

#### 1.10 GUARANTEE

- A. Provide a written, notarized guarantee from the manufacturer stating that the applied sealants shall show no material failure for a period of ten (10) years.
- B. Contractor to provide a written, notarized, guarantee stating that the applied sealants shall show no failure due to improper installation for a period of two (2) years.
- C. Guarantee shall be in a form acceptable to the City of New York and executed by an authorized individual.
- D. Include in guarantee provision, agreement to repair and/or replace, at Contractor's expense, sealant defects which develop during guarantee period, because of faulty labor and/or materials.

### PART 2 PRODUCTS

#### 2.1 SEALANT MATERIALS

- A. Exterior Wall Sealant: Provide one (1) part non-sag sealant equal to No. 790 or 795 made by Dow Corning, "Silpruf SCS 2000" or "LM SCS 2700" made by G.E. or "Spectrem 1" or "Spectrem 3" made by Tremco or "Sonolastic 150" by Sonneborn conforming to the minimum standards of ASTM C 920, Type S, Grade NS, Class 50.
- B. Interior Sealant: Provide a one (1) part acrylic based sealant conforming to ASTM C 834, equal to "AC-20+ Silicone" made by Pecora or equal made by Tremco.
- C. Colors: Custom colors of sealants as selected by the Commissioner.

#### 2.2 MISCELLANEOUS MATERIALS

- A. Back-Up Materials: Provide back-up materials and preformed joint fillers, non-staining, non-absorbent, compatible with sealant and primer, and of a resilient nature, equal to "BHR" made by Nomaco Inc. or approved equal, twenty-five (25) percent wider than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing.
- B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.
- C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.

- D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.
- E. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached. Materials shall be used per manufacturer's printed instructions.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where joint sealers are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 INSTALLATION

- A. Comply, at minimum, with sealant and sealant primer manufacturer recommendations for space ventilation during and after installation. Where feasible, the following ventilation conditions shall be maintained during the sealant/sealant primer curing period or for 72 hours after installation: 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 85 degrees F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in item 2 above.
- B. To the extent practical, allow sealant and sealant primer installations to cure *prior to* the installation of materials that adsorb VOCs. Materials that adsorb VOCs include carpets, textiles, unprimed gwb, and acoustical ceiling panels.
- C. Sealant Installation Standard: Comply with instructions and recommendations of the manufacturer and in accordance with ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements shall apply.
- D. Sample Section of Sealant
  1. During sealant installation work in exterior wall, the manufacturer of sealant shall send his representative to the site, under whose supervision a section of the wall (used as "control section") shall be completed for purposes of determining performance characteristics of sealant in joints. Commissioner shall be informed of time and place of such installation of control section.
  2. Control section shall be installed according to specification given herein and shall not be considered as acceptable until written acceptance is provided by the Commissioner.
  3. Accepted control section shall be standard to which all other sealant work must conform.

- E. Supervision: The Contractor shall submit to the Commissioner written certification from the sealant manufacturer that the applicators have been instructed in the proper application of their materials. The Contractor shall use only skilled and experienced workmen for installation of sealant.
- F. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.
- G. Preparation and Application
1. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.
  2. Stone, masonry and concrete surfaces to receive sealant shall be cleaned where necessary by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
    - a. Do not use any acid or other material which might stain surfaces.
    - b. Remove laitance by grinding or mechanical abrading.
    - c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
  3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.
  4. Do not seal joints until they are in compliance with drawings, or meet with the control section standard.
  5. Joint Size and Sealant Size: Joints to receive sealant shall be at least 1/4" wide. In joint 1/4" to 3/8" wide, sealant shall be 1/4" deep. In joints wider than 3/8" and up to 1" wide, sealant depth shall be one half the joint width. For joints wider than 1", sealant depth shall be as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.
  6. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming. Apply primer with clean brush and only when temperature is above 45 deg. F.

7. **Joint Backing:** In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately twenty-five (25) percent compressions. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.
8. **Bond Breaker:** Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.
9. **Sealant Application:** Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.
10. **Tooling:** Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 4A in ASTM C 1193. Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.
11. Replace sealant which is damaged during construction process.

END OF SECTION

## SECTION 081113

### STEEL DOORS AND FRAMES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the steel doors and frames work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Interior and exterior hollow metal doors and frames for fire rated and unrated door openings.
  - 2. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping necessary.
  - 3. Preparation of hollow metal doors to receive glazing where required.
  - 4. Furnishing anchors for building into masonry and drywall.
  - 5. Factory prime painting of work of this Section.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Unit Masonry - Section 042000.
- F. Installation of doors and frames - Section 062000.
- G. Finish hardware - Section 087100.
- H. Glass and glazing - Section 088000.
- I. Gypsum drywall – Section 092900.
- J. Painting - Section 099000.

#### 1.4 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.
- C. Shop Drawings: Show fabrication and installation of doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, reinforcement for surface applied hardware, dimensions of profiles and hardware preparation, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessories.
- D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.
1. Coordinate glazing frames and stops with glass and glazing requirements.

- E. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

## 1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  - 1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  - 2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  - 3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  - 4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Manufacturer Qualifications: A firm experienced in manufacturing custom steel doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- E. Source Limitations: Obtain custom steel doors and frames through one source from a single manufacturer.
- F. Fire-Rated Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.

1. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40" or less above the sill.
  2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.
  3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 250 deg. F. (or greater if required by Code) maximum in 30 minutes of fire exposure.
- G. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- H. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.
- I. For projects located in New York City, fire rated assemblies must have M.E.A. approval with UL label.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.
  - B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Commissioner; otherwise, remove and replace damaged items as directed.
  - C. Store doors and frames under cover at building site. Conform to the requirements of ANSI A 250-11-2001 for site storage unless more stringent requirements are noted herein. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

## PART 2 PRODUCTS

### 2.1 FABRICATION - GENERAL

- A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.

- C. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."
- D. Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

## 2.2 MANUFACTURERS

- A. Provide products manufactured by Steelcraft, Curries, Ceco Door Products, or approved equal meeting these specifications.

## 2.3 FRAMES

### A. Materials

1. Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A 1008/A, Type B not less than 14 ga., and shall have a hot dipped galvanized coating conforming to ASTM A 924 and A 653 with A-60 coating. The zinc-alloy coating shall be a dull matte surface treated for paint adhesion.
2. Frames for interior openings shall be either commercial grade cold-rolled steel conforming to ASTM A 1008/A, Type B or commercial grade hot-rolled steel conforming to ASTM A 1011/A, Commercial Steel, Type B. Metal thickness shall be not less than sixteen (16) ga. for frames in openings 4'-0" or less in width; not less than fourteen (14) ga. for frames in openings over 4'-0" in width.

### B. Design and Construction

1. All frames shall be welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Unless otherwise noted, knocked-down frames will not be accepted.
2. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.
3. Jamb depths, trim, profile and backbends shall be as shown on drawings.
  - a. Frames at drywall partitions shall be formed with double return backbends to prevent cutting into drywall surface.
4. Welded frames shall have corners mitered and reinforced and faces of welded frames shall be continuously back welded full depth and width of frame conforming to NAAMM Standard HMMA-820; face joints shall be hairline.
5. Minimum depth of stops shall be 5/8".

6. Frames for multiple or special openings shall have mullion and/or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members shall be securely welded and finished smooth.
  - a. Mullions shall have 16 ga. internal steel stiffeners welded not less than 4" o.c.
7. Hardware Reinforcements
  - a. Frames shall be mortised, reinforced, drilled and tapped at the factory for fully-templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates.
  - b. Minimum thickness of hardware reinforcing plates shall be as follows:
    - 1). Hinge and pivot reinforcements - seven (7) ga., 1-1/4" x 10" minimum size.
    - 2). Strike reinforcements - twelve (12) gauge
    - 3). Flush bolt reinforcements - twelve (12) gauge
    - 4). Closer reinforcements - twelve (12) gauge
    - 5). Reinforcements for surface mounted hardware - twelve (12) gauge.
8. Floor Anchors
  - a. Provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
  - b. Minimum thickness of floor anchors shall be fourteen (14) gauge.
9. Jamb Anchors
  - a. Frames for installation in masonry walls shall be provided with adjustable jamb anchors of the wire type. Anchors shall be not less than 0.156" diameter steel wire. The number of anchors provided on each jamb shall be as follows:
    - 1). Frames up to 7'-6" height - three (3) anchors.
    - 2). Frames 7'-6" to 8'-0" height - four (4) anchors.
    - 3). Frames over 8'-0" height - one (1) anchor for each 2'-0" or fraction thereof in height.
  - b. Frames for installation in stud partitions shall be provided with steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely welded inside each jamb as follows:
    - 1). Frames up to 7'-6" height - four (4) anchors.
    - 2). Frames 7'-6" to 8'-0" height - five (5) anchors.
    - 3). Frames over 8'-0" height - five (5) anchors plus one additional for each 2'-0" or fraction thereof over 8'-0".
  - c. Frames to be anchored to previously placed concrete or masonry shall be provided with minimum 3/8" concealed bolts set into expansion shields or inserts at six (6) inches from top and bottom and twenty-four (24) inches o.c.

Reinforce frames at anchor locations with sixteen (16) gauge sheet steel stiffeners welded to frame at each anchor.

10. Anchors in exterior frames and in masonry walls shall be hot dip galvanized per ASTM A 153.
  11. Frames for installation in masonry wall openings more than 4'-0" in width shall have an angle or channel stiffener factory welded into the head. Such stiffeners shall be not less than twelve (12) gauge steel and not longer than the opening width, and shall not be used as lintels or load bearing members.
  12. Dust cover boxes (or mortar guards) of not thinner than twenty-six (26) gauge steel shall be provided at all hardware mortises on frames to be set in masonry or plaster partitions.
  13. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.
  14. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.
  15. Loose glazing stops shall be of cold rolled steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk cadmium-or zinc-plated screws. Interior frames may be provided with snap-on glazing stops.
  16. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single door frames and two (2) silencers on heads of double-door frames.
- C. Finish: After fabrication, all tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Frames shall then be chemically treated to insure maximum paint adhesion and shall be coated on all surfaces with one coat of rust-inhibitive baked-on alkyd primer standard with the manufacturer which is fully cured before shipment to a dry film thickness of 2.0 mils.
1. Frames set in masonry walls shall be grouted in as described in Section 042000 – Unit Masonry. These frames shall have surfaces in contact with grout shop coated with epoxy coating equal to Series 27 FC Typoxy made by Tnemec or approved equal spray applied at 4 to 6 mils, passing NFPA 101, Class A for smoke and flame spread, tested per ASTM E 84.

#### 2.4 HOLLOW METAL DOORS

- A. Materials: Doors shall be made of commercial quality, level, cold rolled steel conforming to ASTM A 1008/A, Commercial Steel, Type B and free of scale, pitting or other surface defects. Face sheets for interior doors shall be not less than eighteen (18) gauge. Face sheets for exterior doors shall be not less than sixteen (16) gauge and shall have a hot dipped galvanized coating conforming to ASTM A 924 and A 653, A-60 coating. The zinc alloy coating shall be a dull matte surface treated for paint adhesion.

## B. Design and Construction

1. All doors shall be of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".
2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.
3. Face sheets shall be stiffened by continuous vertical formed steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be not less than twenty two (22) gauge spaced not more than six (6) inches apart and securely attached to face sheets by spot welds not more than five (5) inches o.c. Spaces between stiffeners shall be sound deadened and thermal insulated the full height of the door with an inorganic non-combustible batt type material.
4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
5. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than fourteen (14) gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attachment of weatherstripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.
6. Edge profiles shall be provided on both vertical edges of doors as follows:
  - a. Single-acting swing doors - beveled 1/8" in two (2) inches.
  - b. Double acting swing doors - rounded on 2-1/8" radius.
  - c. No square edge doors permitted.
7. Hardware Reinforcements
  - a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates.
  - b. Minimum gauges for hardware reinforcing plates shall be as follows:
    - 1). Hinge and pivot reinforcement - seven (7) gauge.
    - 2). Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers - twelve (12) gauge.
    - 3). Reinforcements for all other surface mounted hardware - sixteen (16) gauge.

## 8. Glass Moldings and Stops

- a. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on drawings.
  - b. Fixed moldings shall be securely welded to the door on the security side.
  - c. Loose stops shall be not less than twenty (20) gauge steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced eight (8) inches o.c. Snap-on attachments will not be permitted. Stops shall be flush with face of door.
- C. Finish: After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall then be chemically treated to insure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive alkyd primer as specified for frames which shall be fully cured before shipment.
- D. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in any direction, including in a diagonal direction.

## 2.5 LABELED DOORS AND FRAMES

- A. Labeled doors and frames shall be provided for those openings requiring fire protection ratings as scheduled on drawings. Such doors and frames shall be labeled by Underwriters' Laboratories or other nationally recognized agency having a factory inspection service.
- B. If any door or frame specified by the Commissioner to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, the Commissioner shall be so advised before fabricating work on that item is started.

## 2.6 HARDWARE LOCATIONS

- A. The location of hardware on doors and frames shall be as noted in "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames" of the Door Hardware Institute unless otherwise required by prevailing Handicap Codes.

## 2.7 CLEARANCES

- A. Fabricate doors and frames to meet edge clearances as follows:
  1. Jambs and Head: 1/8" plus or minus 1/16".
  2. Meeting Edges, Pairs of Doors: 1/8" Plus or minus 1/16".
  3. Bottom: 3/4", if no threshold.
  4. Bottom: 3/8", at threshold.
- B. Fire rated doors shall have clearances as required by NFPA 80.

2.8 MANUFACTURING TOLERANCES

- A. Manufacturing tolerance shall be maintained within the limits given in HMMA 841 of ANSI/NAAMM, current edition.

2.9 PREPARATION FOR FINISH HARDWARE

- A. Prepare door and frames to receive hardware:
  - 1. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.
  - 2. Preparation includes sinkages and cut-outs for mortise and concealed hardware.
- B. Provide reinforcements for both concealed and surface applied hardware:
  - 1. Drill and tap mortise reinforcements at factory, using templates.
  - 2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.10 REJECTION

- A. Hollow metal frames or doors which are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed and replaced with new at no cost.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where steel doors and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Refer to Section 062000 for installation procedures for all work of this Section.

END OF SECTION

## SECTION 083113

### ACCESS DOORS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the access doors as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. GFRG access panels at drywall.
  - 2. Provide access doors and frames for access from occupied spaces to the following, where indicated or required, and as directed by the trades of Divisions 15 and 16.
    - a. All shutoff or balancing valves.
    - b. Fire dampers, as required.
    - c. Points of duct access.
    - d. Pull boxes.
    - e. Controls of mechanical and electrical items.
    - f. Pipe spaces, if required.
    - g. Inlets of fans.
    - h. Fusible link and splitter damper at filter bank.
    - i. Automatic damper and motor.
    - j. Equipment not otherwise accessible.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Drywall - Section 092900.
- F. Valves and connections - Division 22.

#### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  - 1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  - 2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  - 3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  - 4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. For actual installation of the work of this Section, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the skills required.
- D. Size Variations: Obtain Commissioner's acceptance of manufacturer's standard size units which may vary slightly from sizes shown or scheduled.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 --1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.

- c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
- B. Before any materials of this Section are delivered to the job site, submit complete manufacturer's literature to the Commissioner. Submit plans and schedules showing size and location of each and every access door for Commissioner's acceptance prior to installation.

## 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## PART 2 PRODUCTS

### 2.1 GFRG ACCESS PANELS

- A. Provide access panels made from glass fiber reinforced gypsum (GFRG) as manufactured by Castle Access Panels and Forms Inc., or equivalent product of Wind-Lock, Formglas, IntexForms, or approved equal.
  1. Provide access panels architecturally designed to blend seamlessly with drywall ceiling and wall construction. Coordinate work with Section 092900, "Gypsum Drywall."
  2. Panels shall be Class A rated, with a flame spread and smoke developed index of 0 in accordance with ASTM E 84.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where access doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 COORDINATION

- A. Coordinate all work with the mechanical trades to insure proper locations and in a timely manner to permit orderly progress of the total work.
- B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- C. Adjust hardware and panels after installation for proper operation.
- D. Remove and replace panels or frames which are warped, bowed, or otherwise damaged.

END OF SECTION

## SECTION 084228

### ALL GLASS DOORS AND PARTITIONS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the all glass doors and partitions, as shown on the drawings, and/or specified herein, as needed for a complete and proper installation, including the following:
  - 1. 3/4" fully tempered and laminated low iron glass (basis of design Starphire) doors and partitions.
    - a. 4" full bottom rail, aluminum.
    - b. Full top rail aluminum.
    - c. Top center pivot hinge plate, aluminum.
    - d. Top plate for mounting of electric lock clad in stainless steel.
    - e. 1" dia. push pull bars.
    - f. Recessed floor closer, center pivots.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Finish hardware - Section 087100.
- F. Glass and glazing - Section 088000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions,

or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

B. Special Experience Requirements

1. Installer: The contractor or subcontractor performing the work of this Section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

1.5 PERFORMANCE REQUIREMENTS

A. Provide systems, including anchorage, capable of withstanding loads indicated without structural failure, deflection exceeding specified limit, support components transferring stresses to glazing, and glazing-to-glazing or glazing-to-support contact as determined by structural analysis.

1. Structural Loads: Lateral load of 5 psf.
2. Deflection Normal to Glazing Plane: Limited to 1/360 of clear span or 1/8", whichever is smaller.

1.6 SUBMITTALS

A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.

B. Product Data: For each type of product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.

C. Shop Drawings: Show details of fabrication and installation, including the following:

1. Plans, elevations, and sections.
2. Details of fittings.
3. Hardware quantities, locations, and installation requirements.
4. Anchorages and reinforcement.
5. Glazing details.

D. Samples for Verification: Of size indicated below and of same thickness and material indicated for Work. Show the full range of color and texture variations expected.

1. Metal Finishes: 12-inch long sections of patch fittings, rails, and other items.
2. Glass: 12 inches square showing exposed-edge finish.

#### 1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

#### 1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify opening dimensions of all-glass entrances by field measurements before fabrication and indicate measurements on Shop Drawings.

#### 1.9 WARRANTY

- A. Submit a written warranty executed by the manufacturer agreeing to repair or replace components of all-glass entrances that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
1. Structural failures.
  2. Deterioration of metals, and metal finishes, and other materials beyond normal interior usage.
  3. Failure of operating components to function normally.
- B. Warranty Period: 2 years from date of Substantial Completion.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Provide all glass doors as manufactured by C. R. Laurence, or equivalent product of Blumcraft, Virginia Glass Products Corp., or approved equal.

## 2.2 MATERIALS

- A. Clear Glass (low iron Starphire by PPG): ASTM C 1048, Kind FT (fully tempered) and laminated ASTM C1172, Condition A (uncoated surfaces), Type I (transparent), Class 1 (clear) requirements. Provide products of thickness indicated that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to CPSC 16 CFR, Part 1201 for Category II materials.
1. Thickness: 3/4 inch.
  2. Exposed Edges: Flat polished.
  3. Corner Edges: Mitered.
- B. Aluminum Extrusions: ASTM B 221, with strength and durability characteristics of not less than Alloy 6063-T5.

## 2.3 COMPONENTS

- A. Basis of Design: Provide the following by CR Laurence Co., Inc. (CRL) or equal:
1. CRL Low Profile Sidelite Rail and CRL Low Profile Door Rail (2-5/16" tall by 1-1/2" wide, anodized aluminum.
  2. CRL Brushed Stainless Steel Rigid Combination Fastener for 1/2" to 1-1/16" Glass, brushed stainless – or Pilkington SD02104.
  3. CRL Satin Anodized Aluminum 1-1/4" Diam. 12"x28" Straight Combination Handle.
  4. Dorma Elec In Ground Swing Operator ED400IG
- B. Fittings: Provide fittings and accessories for all-glass entrances of configurations shown on drawings fabricated of stainless steel, minimum 12 ga. Provide the following, in brushed stainless steel, as manufactured by C.R. Laurence Co., Inc., or equal:
1. CRL Offset Bottom Door Patch.
  2. CRL Offset Top Door Patch.
  3. CRL Free Swing Top Pivot.
  4. CRL Free Swing Bottom Pivot.
- C. Top Railing: 0.125" thick aluminum with satin anodized (A-31) finish, dimensions as indicated.
- D. Recessed Shoe Molding: Clear anodized (A-31) aluminum, alloy 6063-T52, dimensions as indicated.
- E. Rail System: Manufacturer's standard clamp-on rail system, "DRS Rail System" as manufactured by Dorma, or approved equal; finish as selected by the Commissioner.

- F. Provide sound-dampening door seals at back edge of door; to seal gap between door and fixed panel, as detailed on the drawings.
- G. Anchors and Fastenings: Manufacturer's standard concealed anchors and fastening.

#### 2.4 HARDWARE

- A. General: Heavy-duty hardware units indicated in sizes, numbers, and type recommended by manufacturer for all-glass entrances indicated. For exposed parts, match fitting metal and finish.
- B. Concealed Floor Closers and Top Pivots: Center-hung, complying with ANSI/BHMA A156.4, Grade 1 or Grade 2 requirements, including cases, bottom arms, top pivots, plates and accessories required for a complete installation, and as follows:
  - 1. Swing: Single acting.
  - 2. Hold Open: Selective.
  - 3. Positive Dead Stop: Coordinated with hold-open angle.
  - 4. Delayed-Action Closing: Comply with requirements of authorities having jurisdiction of the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," whichever are more stringent.
    - a. Opening Force: 5 lbf.
- C. Push-Pull: 1" dia. aluminum with clear anodized finish, as shown on drawings.
- D. Make provisions for and coordinate with installation requirements for electro/magnetic lock and door release at door head as specified in Section 087100.
- E. Threshold: Manufacturer's standard threshold with cutouts coordinated for operating hardware, with anchors and jamb clips, not more than 1/2 inch high with beveled edges providing a floor-level change with a slope of not more than 1:2, and fabricated of stainless steel.
- F. All exposed cover plates and hardware shall be aluminum with a clear anodized finish as specified below.

#### 2.5 FABRICATION

- A. General: Fabricate all-glass components in sizes, profiles, and configurations indicated.
  - 1. Provide holes and cutouts in glass to receive hardware, fittings, rails, and accessories before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.
  - 2. Fully temper glass using horizontal roller hearth process.
  - 3. Factory assemble components and factory install hardware to greatest extent possible.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where all glass doors and partitions are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install all-glass doors, partitions, and associated components according to manufacturer's written instructions; coordinate installation with glass wall fabricator.
- B. Set units level and plumb.
- C. Maintain uniform clearances between adjacent components.
- D. Lubricate hardware and other moving parts according to manufacturer's written instructions.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points, and for smooth operation.

3.4 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer, that ensure all-glass doors and partitions are without damage or deterioration.

END OF SECTION

## SECTION 085200

### EXTERIOR WOOD WINDOWS AND DOORS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the exterior wood windows and doors, as shown on the drawings and/or specified herein, including but not limited to, the following:

1. Wood double hung windows.
2. Wood outswinging projected windows.
3. Swinging wood doors.
4. Glass and glazing for doors and windows.
5. Insulation along perimeter of windows.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Unit masonry - Section 042000.
- F. Wood blocking - Section 062000.
- G. Flashing - Section 076200.
- H. Sealant work - Section 079200.
- I. Finish hardware - Section 087100.
- J. Painting - Section 099000.

#### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Qualifications
  - 1. Fabricator: Single fabricator regularly engaged for at least three (3) years fabricating products of the kind and quality required for the Project.
  - 2. Installer: Experienced carpenter contractor who has completed comparable work.
- C. Design Criteria
  - 1. Wall Openings: Accommodate allowable building wall construction tolerances and moisture caused brick masonry swelling without stressing or deforming window units or over stressing anchorage.
  - 2. Moisture Changes: Accommodate wood shrinking and swelling caused by ambient condition at the Project without stressing window units, over-stressing anchorage, causing sash to bind, or exceeding air/water entry limits.
  - 3. Exterior work has been approved by NYC Landmarks Preservation Commission. No modifications shall be made that would have an impact on the submitted/approved appearance of the facades.

#### 1.5 LEED PERFORMANCE REQUIREMENTS

- A. The following criteria are REQUIRED for the products included in this section:
  - 1. Engineered wood, not including salvaged wood, shall contain a minimum of 10% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  - 2. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the Submittal Requirements of this Section.
  - 3. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

4. Wood Materials harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section.
5. Permanently Installed wood-based materials used in this project that have been certified in accordance with the Forest Stewardship Council (FSC) guidelines shall be documented in accordance with the Submittal Requirements of this Section.
  - a. Applicable products include, but are not limited to, structural framing and general dimensional framing, flooring, finishes, built-in furnishings, miscellaneous blocking, fire rated plywood back panels used for equipment mounting, architectural panels, and plywood.
  - b. Certified wood material suppliers may be researched through the following websites: [www.rainforest-alliance.org/greenbuilding](http://www.rainforest-alliance.org/greenbuilding), [www.smartwood.org](http://www.smartwood.org), <http://www.certifiedwoodsearch.org/searchproducts.aspx>, [http://www.fscus.org/certified\\_companies/](http://www.fscus.org/certified_companies/).
  - c. Wood products previously purchased and used on prior projects, which are reused on this Project, are exempt from the FSC certification requirement. Appropriate documentation certifying reused wood products must be submitted.
6. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419, Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints, and Coatings,(LEED BUILDING) where applicable.
7. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior shall meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.
 

a. Clear Wood Finishes	
1). Varnish	350
2). Sanding Sealers	350
3). Lacquer	550
b. Shellac	
1). Clear	730
2). Pigmented	550
c. Stains	250
d. Floor Coatings	100
e. Waterproofing Sealers	250
f. Sanding Sealers	275
g. Other Sealers	200
8. The calculation of VOC shall exclude water and tinting color added at the point of sale.
9. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.

## 1.6 DEFINITIONS

- A. Performance grade number, included as part of the AAMA/NWWDA product designation code, is actual design pressure in pounds force per square foot used to determine structural test pressure and water test pressure.
- B. Structural test pressure, for uniform load structural test, is equivalent to 150 percent of design pressure.

## 1.7 PERFORMANCE REQUIREMENTS

- A. General: Provide wood windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified and that are of test size indicated below:
  - 1. Minimum size required by AAMA/NWWDA 101/I.S.2.
- B. AAMA/NWWDA Performance Requirements: Provide wood windows of the performance class and grade indicated that comply with AAMA/NWWDA 101/I.S.2.
  - 1. Performance Class: HC.
  - 2. Performance Grade: 60.
  - 3. Exception to AAMA/NWWDA 101/I.S.2: In addition to requirements for performance class and performance grade, design fixed glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on the following:
    - a. Testing performed according to AAMA/NWWDA 101/I.S.2, Uniform Load Deflection Test.
- C. Wood doors shall conform to HGD-HC40 of AAMA/NWWDA 101/I.S. 2-97.

## 1.8 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the wood product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. Location in which wood materials were manufactured or fabricated and location from which wood was harvested.
    - c. For wood products, indication (Y/N) of whether the supplied product(s) are certified by the Forest Stewardship Council (FSC).
    - d. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment. Include total cost for all wood products and itemized costs for all FSC-certified wood products.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. Documentation that all composite wood and agrifiber products do not contain added urea-formaldehyde resins.
  6. Chain of custody certificate to document FSC-certification, if applicable.
- B. Wood Samples: Duplicate pairs of samples for each species of unfinished and transparent finished wood proposed for production work.
1. Samples shall be large enough to accurately show typical appearance characteristics.
  2. Each pair of samples shall show extremes of appearance characteristic of range proposed for the work. Wood used for production shall be within this range.
- C. Mock-Ups: Window and door assemblies for typical wall openings shall be provided, complete and ready to install.
- D. Shop Drawings
1. Window types, sizes, locations, and quantities, keyed to scale elevations. Identify materials, finish and species of woods, glazing types, hardware and anchoring provisions.
  2. Door types, sizes, locations, and quantities keyed to scale elevations. Identify materials, finish and species of woods, glazing types, hardware and anchoring provisions.
  3. Details: Full or large scale, keyed to scale elevations. Show frame and sash construction, glazing, weep/vent provisions, hardware, weatherstripping and anchorage.
  4. Installation: Clearly show relation to adjoining construction. Give blocking requirements, clearances, and instructions necessary for proper installation.
- E. Certifications

1. Fabricator Qualifications: Not less than three (3) years prior successful production of units similar to those required. List projects having windows of the kind required for the project. Installations shall have been done to meet job conditions and performance requirements of the kind shown and specified for this Project. Give installation dates, locations, contact names, addresses, and phone numbers for each project.
  2. Test Report: Certified independent testing agency reports to show compliance with specified window and door performance requirements. Tests shall have been made within three (3) years of submission. They shall include test descriptions and results, and complete enough product descriptions to show that tested products are representative of those proposed for the project.
    - a. Independent testing laboratory shall meet criteria of ASTM E 548.
- F. Maintenance Instructions: Two copies of manufacturer's Technical Manual with recommendations for routine maintenance of window and door units, hardware and wood finishes, and instructions for removing and replacing sash and glass.

#### 1.9 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver factory assembled windows and doors in enclosed vans. Bundle and label loose materials as necessary to prevent loss and damage.
- B. Store products in a clean, protected, dry, well-ventilated building, on platforms or blocking at least 4" above floor. Stack products so they do not warp, bend or twist. Store windows and doors upright, not flat or leaning, with at least 1/4" air space between units.
- C. Handle windows and doors with clean hands or canvas gloves.

#### 1.10 JOB CONDITIONS

- A. Connecting Work: Constructed or specified tolerances. Field dimensions agreed upon, prior to fabrication.
- B. Reference Points: Bench marks and other required reference points shall be established.
- C. Environmental Conditions: Air temperature during installation shall be at least 40 deg. F. and rising, and the wind light or still. Work areas and materials shall be dry and free of ice and snow.
- D. Field Measurements: Verify wood window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
  1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating wood windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

## 1.11 WARRANTY

- A. Warrant windows and doors for a period of five (5) years against damage or defects of any kind, including defective materials and installation.
  - 1. Insulating glass shall be warranted for a period of ten (10) years.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Lumber: Wood species for exterior and interior members shall be Mahogany (*Swietenia Macrophylla* or *Khayd Ivorensis*). All pieces shall be dried to an average moisture content of 12% (9-14% for individual pieces) before assembly and treatment.
  - 1. Wood for exterior members shall match existing to the approval of the Landmarks Preservation Commission.
- B. Anchor Bolts and Screws: Hex head thru bolts and flat head wood screws shall be of corrosion resistant type (galvanized or stainless steel).
- C. Waterproof Adhesive: Resorcinol or melamine type.
- D. Anchor Clips: Teco, Simpson or equal.
- E. Hardware for Windows
  - 1. Sash Locks: Oxidized bronze alloy latch located at side of unit and designed to be manually operated. Finishes shall be red bronze (US-20) or white bronze (US-25) as selected by the Commissioner.
  - 2. Hinges: Solid brass.
  - 3. Sash Balances: Spring counter balance comprised of a stainless steel cable held within a stainless steel housing.
  - 4. Insect Screens: Frames shall be tubular aluminum extrusions in manufacturer's standard colors. Mesh shall be 18/16 screen cloth in manufacturers standard materials and finishes, of charcoal aluminum, mill finish aluminum, stainless steel, bright brass, or bright copper.
- F. Weatherstripping: Extruded ethylene propylene, neoprene or other plastic that remains flexible and non-sticky at project ambient temperature extremes.
- G. Door Hardware: Refer to Section 087100.
- H. Insulation along perimeter of windows: "Great Stuff" by Dow or approved equal.

### 2.2 FABRICATION

- A. Windows

1. Produced from standard components. Wood components shall be solid lumber. Like parts shall be interchangeable. Fitting, machining for hardware and glazing shall be done in the factory.
2. Frames: AWI Premium Grade Exterior Frames.
3. Sash: AWI Premium Grade Finished Exterior Sash. Fixed and operable sash incorporate removable interior glass stops for ease of reglazing.
4. Acceptable Fabricator: Duratherm Windows Corp., Zeluck Inc. or Woodstone.

B. Doors

1. Door Panels, Swing: AWI premium grade, produced from standard components. Stiles and rails shall be glued block construction with 1/8" minimum veneers. Joinery shall be blind mortise and tenon construction, sized for a drive fit, with tenon set in adhesive and pinned. Glazed doors to incorporate interior removable glass stops for reglazing. Glazing channels to be weeped to exterior. Sections of stiles, rails and muntins to match details on drawings.
2. Door Frame, Swing: AWI Premium grade, wood components shall be solid wood.
3. Machining for swing door hardware must be predicated on the issuance of physical samples, not templates.
4. Acceptable Fabricator: Duratherm Windows Corp., Zeluck Inc. or Woodstone.

C. Permanent Joints and Facings: Bonded with water resistant adhesive.

D. Preservative Treatment: Water repellent preservative treatment per NWMA I.S.4.

E. Wood Finish

1. For wood assemblies to be field painted, factory prime only using Benjamin Moore Moorcraft Alkyd Exterior Primer or approved equal.

F. Glazing

1. All assemblies shall be factory pre-glazed. Glazing channels for windows shall be pressure relief vented.
2. Glass for doors shall be clear low-iron glass, Starphire by PPG or equal, laminated and tempered, 9/16" thick, two layers of 1/4" thick.
3. Glass for windows shall be 3/4" thick minimum clear insulating glass with Low E coating on No. 2 face; insulating glass shall conform to "CBA" classification of IGCC; ten (10) year warranty.
4. Window assembly performance criteria:
  - a. U-value: 0.40 max
  - b. SHGC: 0.40
  - c. Air Leakage: 0.03 CFM/SF

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions to which this work is to be attached or applied, and correct any conditions which are detrimental to the proper and expeditious installation of the work. Starting of the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
- B. Verify dimensions taken at the job site affecting the work. Bring field dimensions which are at variance to the attention of the Commissioner. Obtain decision regarding corrective measures before the start of installation.

### 3.2 INSTALLATION

- A. General: Install windows and doors per approved shop drawings, in proper relation to adjoining construction. Do not twist frames or force fit them into poorly prepared openings. Anchor windows and doors as required to satisfy design requirements. See manufacturer's installation instructions and approved shop drawings.
- B. Center window and door units in wall openings, leaving a uniform interface caulking recess on all four sides.
- C. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- D. Set sill members in bed of sealant or with gaskets, as required, for weathertight construction.
- E. Anchorage: Install anchors through frame centerline beside shims. Anchor units to wood blocking with wood screws and to metal framing with toggle bolts; countersink anchor heads. All anchors shall be concealed by closed sash, or in the case of fixed units, with plugs.
- F. Installation to conform to window manufacturer's requirements as indicated in the manufacturer's Technical Manual.
- G. Field installation of finish hardware for swing doors to conform to provisions of Section 087100 - Finish Hardware and Section 062000 - Carpentry.
- H. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWWDA 101/I.S.2.

### 3.3 ADJUSTING

- A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

### 3.4 PROTECTION AND CLEANING

- A. Protect window and door surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- B. Clean exposed surfaces immediately after installing windows and doors. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean factory-glazed glass immediately after installing windows and doors. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

## SECTION 08 71 00

### DOOR HARDWARE

#### PART 1 - GENERAL

##### 1.1 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
1. Door hardware for steel (hollow metal) doors.
  2. Door hardware for aluminum doors.
  3. Door hardware for wood doors.
  4. Door hardware for other doors indicated.
  5. Keyed cylinders as indicated.
- B. Related Sections:
1. Division 6: Rough Carpentry.
  2. Division 8: Aluminum Doors and Frames
  3. Division 8: Hollow Metal Doors and Frames.
  4. Division 8: Wood Doors.
  5. Division 26 Electrical
  6. Division 28: Electronic Security
- C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
1. Builders Hardware Manufacturing Association (BHMA)
  2. NFPA 101 Life Safety Code
  3. NFPA 80 -Fire Doors and Windows
  4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
  5. UL10C – Positive Pressure Fire Test of Door Assemblies
  6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
  7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
- D. Intent of Hardware Groups
1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
  2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.
- E. Allowances
1. Refer to Division 1 for allowance amount and procedures.
- F. Alternates
1. Refer to Division 1 for Alternates and procedures.

1.2 SUBSTITUTIONS:

- A. Comply with Division 1.

1.3 SUBMITTALS:

- A. Comply with Division 1.

- B. Special Submittal Requirements: Coordinate submittals of this Section with related Sections to ensure the "design intent" of the system/assembly is understood and can be reviewed together.

- C. Product Data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.
3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
4. Submit 6 copies of catalog cuts with hardware schedule.

- D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.

1. List groups and suffixes in proper sequence.
2. Completely describe door and list architectural door number.
3. Manufacturer, product name, and catalog number.
4. Function, type, and style.
5. Size and finish of each item.
6. Mounting heights.
7. Explanation of abbreviations and symbols used within schedule.
8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.

- E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.

1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.

- F. Samples: (If requested by the Architect)

1. 1 sample of Lever and Rose/Escutcheon design, (pair).
2. 3 samples of metal finishes

- G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.

1. Operating and maintenance manuals: Submit 3 sets containing the following.

- a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
- b. Catalog pages for each product.
- c. Name, address, and phone number of local representative for each manufacturer.
- d. Parts list for each product.

2. Copy of final hardware schedule, edited to reflect, "As installed".
3. Copy of final keying schedule

4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

#### 1.4 QUALITY ASSURANCE

##### A. Comply with Division 1.

1. Statement of qualification for distributor and installers.
2. Statement of compliance with regulatory requirements and single source responsibility.
3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
  - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
  - b. Hardware Schedule shall be prepared and signed by an AHC.
4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
  - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
  - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

- B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

##### A. Packing and Shipping: Comply with Division 1.

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

- B. Storage and Protection: Comply with manufacturer's recommendations.

#### 1.6 PROJECT CONDITIONS:

- A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

- A. Refer to Conditions of the Contract
- B. Manufacturer's Warranty:
  - 1. Closers: Ten years
  - 2. Exit Devices: Three Years
  - 3. Locksets & Cylinders: Three years
  - 4. All other Hardware: Two years.

1.8 OWNER'S INSTRUCTION:

- A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
  - 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
  - 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
  - 3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.
- B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved:</u>
Hinges	Stanley	Bommer, Hager, or equal
Locksets	Best	or equal
Cylinders	Best	or equal
Exit Devices (Entry Door)	Van Duprin	or equal
Exit Devices (others)	Adams Rite	or equal
Closers	Norton	Stanley D-4550
Floor Closers, Pivots	Dorma	or equal
Magnetic Locks	Dorma	or equal
Power supply	Dorma	or equal
Push/Pull Plates	Burns	Rockwood, Trimco, or equal
Push/Pull Bars	Burns	Rockwood, Trimco, or equal
Protection Plates	Burns	Rockwood, Trimco, or equal
Door Stops	Rockwood	Burns, Trimco, or equal
Threshold & Gasketing	Reese	National Guard, Zero, or equal

2.2 MATERIALS:

A. Hinges:

1. Template screw hole locations
2. Minimum of 2 permanently lubricated non-detachable bearings
3. Equip with easily seated, non-rising pins
4. Sufficient size to allow 180-degree swing of door
5. Furnish hinges with five knuckles and concealed bearings
6. Provide hinge type as listed in schedule.
7. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
8. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
9. UL10C listed for Fire

B. Mortise Type Locks and Latches:

1. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C
2. Fit ANSI A115.1 door preparation
3. Functions and design as indicated in the hardware groups
4. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
5. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel
6. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
7. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
8. Provide sufficient curved strike lip to protect door trim
9. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
10. Lock shall have self-aligning, thru-bolted trim
11. Levers to operate a roller bearing spindle hub mechanism
12. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
13. Spindle to be designed to prevent forced entry from attacking of lever
14. Provide locksets with 7-pin removable and interchangeable core cylinders
15. Each lever to have independent spring mechanism controlling it
16. Core face must be the same finish as the lockset

C. Exit Devices shall:

1. Tested and approved by BHMA for ANSI 156.3, Grade 1
2. Provide a deadlocking latchbolt
3. Non-fire rated exit devices shall have cylinder dogging.
4. Touchpad shall be "U" style for entry door and "T" style for all others.
5. Exposed components shall be of architectural metals and finishes.
6. Lever design shall match lockset lever design
7. Provide strikes as required by application.
8. Fire exit devices to be listed for UL10C
9. UL listed for Accident Hazard
10. Shall consist of a cross bar or push pad, the actuating portion of which extends across, shall not be less than one half the width of the door leaf.
11. Provide vandal resistant or breakaway trim

D. Cylinders:

1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
3. Coordinate and provide as required for related sections.

E. Door Closers shall:

1. Tested and approved by BHMA for ANSI 156.4, Grade 1
2. The sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 in (75 mm) from the latch, measured to the leading edge of the door.
3. The maximum force for pushing or pulling open a door shall be as follows:
  - a. Fire doors shall have the minimum opening force allowable by the appropriate administrative authority.
  - b. Other doors:
    - i. exterior hinged doors: 8.5 lbf
    - ii. interior hinged doors: 5 lbf (22.2N)
    - iii. sliding or folding doors: 5 lbf (22.2N)
4. If automatic door closer is used it shall comply with ANSI/BHMA A156.10-1984.
5. UL10C certified
6. Closer shall have extra-duty arms and knuckles
7. Conform to ANSI 117.1
8. Maximum 2 7/16 inch case projection with non-ferrous cover
9. Separate adjusting valves for closing and latching speed, and backcheck
10. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
11. Full rack and pinion type closer with 1 1/2" minimum bore
12. Mount closers on non-public side of door, unless otherwise noted in specification
13. Closers shall be non-handed, non-sized and multi-sized.

F. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.

1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
2. Provide fastener suitable for wall construction.
3. Coordinate reinforcement of walls where wall stop is specified.
4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered

G. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.

H. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.

I. Push Pull Bars: Provide ANSI J504, .1" Dia. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.

J. Pulls: Solid Brass, Center to Center: 8", Length: 8-1/2", Projection: 2-1/2".

K. Power Supply: Provide power supply for (ELR) Electric Latch Retraction exit devices

1. Motherboard will accept up to four plug-in Control Modules. Provide the appropriate necessary control module to operate the number of ELR exit devices used at each opening. The Control

- Module shall include a Time delay Feature, variable (0-4 minutes) latch retraction period in response to a momentary input.
2. UL Listed for class II output
  3. Include circuit breakers for protection of motherboard
  4. 115 or 230 Volt user selectable switch, with AC input= 115 Volt at 1 Amp
  5. Control module shall include Fire alarm terminal and Auxiliary contacts for remote signaling.
  6. Precision ELR150 Series with the required modules.
- L. Power Supply: PS160 Use with a variety of applications including Electric Locking and Exit Alarm The power supply uses 120 VAC at 0.8 amp input. A 230 VAC at 0.3 ampere is available. The power shall be able to control up to (4) Delayed Egress Exit devices. The filtered and regulated output power is field selectable for 12 or 24 VDC at 2 amps.
1. Fire Alarm release that accepts normally closed contact
  2. AC input is protected via a manually reset circuit breaker
  3. DC output is protected via an auto-reset fuse (PTC)
  4. Box shall include a key lock.
- M. Electromagnetic Locks: BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door
1. Type: Full exterior or full interior, as required by application indicated.
  2. Strength Ranking: 1500 lbf.
- N. Power Supply: Field Selectable 12VDC or 24VDC output. The power supply will be specifically designed to support electric locks and access controls. The power supply uses 115 VAC at 800mA input. The power shall be able to be expanded to four station controls. The filtered and regulated output power is field selectable for 12 or 24 VDC.
1. Fire Alarm/Life Safety emergency release included in power supply.
- O. Door Position Switch: Provide door position switch for door status monitoring as indicated in hardware sets.
1. At all fired rated doors the door and frame hardware preparation will be provided by the door and frame manufacturer or by an authorized label service agent.
- P. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.
- Q. Weatherstripping: Provide at head and jams only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
  2. UL10C Positive Pressure rated seal set when required.
- R. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
  2. UL10C Positive Pressure rated seal set when required.
- S. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½" for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.
- T. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occur.

2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.5, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- B. Cylinders, removable and interchangeable core system: Best Cormax Patented 7-pin.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Transmit permanent keys and cores, Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
  - 1. 1 each Grand Masterkeys
  - 2. 4 each Masterkeys
  - 3. 2 each Change keys each keyed core
  - 4. 15 each Construction masterkeys
  - 5. 1 each Control keys
- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
  - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
  - 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
  - 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
  - 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
  - 1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
  - 1. Check and adjust closers to ensure proper operation.
  - 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
    - a. Verify levers are free from binding.
    - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
  - 3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

**Manufacturer List**

<u>Code</u>	<u>Name</u>
AR	Adams Rite
BE	Best Access Systems
BY	By Others
DM	Dorma Door Controls
EM	Emtek
KA	Kant-Slam
NA	National Guard
NO	Norton
PR	Precision
RO	Rockwood
RS	Reese Enterprises Inc.
ST	Stanley
TR	Trimco
IV	Ives
VD	Van Duprin

**Finish List**

<u>Code</u>	<u>Description</u>
AL	Aluminum
US28	Aluminum
626	Satin Chromium Plated
628	Satin Aluminum, Clear Anodized
630	Satin Stainless Steel
689	Aluminum Painted
US10	Dull Bronze
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull
OB	Oil Rubbed Bronze
DBAA	Dark Bronze Anodized Aluminum

**Option List**

<u>Code</u>	<u>Description</u>
18	CONCEALED WIRES - 18 AWG (8)
AC	MOUNTING KIT - FOR ALUMINUM DOORS
BF	BARRIER FREE OPENING FORCE
CD	CYLINDER DOGGING
CE	CONC. WIRES-USE WITH 18,54,56,58 SUFFIX
FL	Fire Exit Hardware
ATR	ALUMINUM TOP RAIL ARMATURE BRACKET
B4E	BEVELED 4 EDGES
ELR	ELECTRIC LATCH RETRACTION
NRP	NON REMOVEABLE PIN HINGE
N-MD	"N" THRU BUTTON MTG - HM DRS
C-SUNK-KP	COUNTER SINKING OF KICK PLATES
4' LONG WIRES	EXTRA LONG WIRES (4')

### Hardware Sets

**SET #1**

4 Hinges	FBB179 4 1/2 X 4 1/2 NRP	26D	ST
1 Exit Device	2103 X 1703A CD (w/ matching endcaps)	630	PR
1 Mortise Cylinder	1E-74 PATD	626	BE
1 Rim Cylinder	1E-72 PATD	626	BE
1 Door Closer	D-4550 CS	689	ST
1 Door Position Switch	By Security Provider		BY
1 Saddle Threshold	425	AL	NA
1 Weatherstrip	160S @ Head and Jambs		NA
1 Door Sweep	200 NA		NA

NOTE: Coordinate electrical requirements with related trades and sections

**SET #2**

7 Hinges	FBB179 4 1/2 X 4 1/2 NRP	26D	ST
1 Elect. Hinge	CE CEFBB179 4 1/2 X 4 1/2 18 4' LONG WIRES	26D	ST
1 Exit Device	5575 (with 589 cover plate)	US10	VD
1 Exit Device	5547WDC	US10	VD
2 Rim Cylinder	3216	US10	VD
1 Elec Entry Trim	3080E-02-8-33MUS32D 12VDC,FS	630	AR
1 Elec Entry Trim	3080E-02-7-33MUS32D 12VDC,FS	630	AR
1 Elec In Ground Swing Operator	ED400IG		DM
1 In Floor Door Closer	BTS 75/G BF	626	DM
1 Card Reader	By Security Provider-verify with NYPL		BY
2 Door Position Switch	By Security Provider		BY
2 Door Contacts	By Security Provider		BY
1 Power Supply	ELR151		PR
2 Drop Plate	P45-180	689	ST
1 Weatherstrip	160S @ Head and Jambs		NA
1 Astragal Set	140 PA SET FATT 95"		NA
2 Door Sweep	200 NA		NA
1 Lip Threshold	896 VBR 72" BR		NA
2 Door Pulls	86184	OB	EM
1 Threshold	280D	DBAA	RS
2 Threshold	480D	DBAA	RS
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

NOTE: Card Reader unlocks electric exit device. Both doors can be dogged for push pull operation. Door position switch monitors door position. Coordinate electrical requirements with related trades and sections.

**SET #100**

3 Hinges	FBB179 4 1/2 X 4 1/2 NRP	26D	ST
1 Exit Device	3310-M1-8136	628	AR
1 Set End Caps	For 3300-Ser. Exit Device (to match)	628	AR
1 Electrified Entry Trim	3080E-02-8-33-35-M (For Exit Device) 12VDC,FS	630	AR
1 Rim Cylinder	1E-74 PATD	626	BE
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689	NO
1 Floor Dome Stop	443	626	RO
1 Gasketing	5050 B @ Head and Jambs		NA
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

**SET #101**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset	45H-7D 3R PATD	626	BE

1 Door Closer	8501SN (REGULAR ARM) (AL)	689	NO
3 Door Silencers	608	GRY	RO

**SET #102**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset (Dormitory)	45H-7TA3R-PATD	630	BE
1 Door Closer	8501SN (REGULAR ARM) (AL)	689	NO
1 Floor Dome Stop	443	626	RO
3 Door Silencers	608	GRY	RO

**SET #103**

2 Hinges	FBB168 4 1/2 X 6 NRP	26D	ST
1 Elect. Hinge	CE CEFBB168 4 1/2 X 6 18 4' LONG WIRES	26D	ST
1 Exit Device	3310M1-8136 (w/ matching endcaps)	628	AR
1 Set End Caps	For 3300-Ser. Exit Device (to match)	628	AR
1 Elec Entry Trim	3080E-02-8-33MUS32D 12VDC,FS	630	AR
1 Mortise Cylinder	1E-74 PATD	626	BE
1 Rim Cylinder	1E-72 PATD	626	BE
1 Gate Closer	KANT-SLAM		KA
1 Kick Down Holder	FS452-4	US28	IV
1 Wall Stop	402	626	RO
1 Card Reader	By Security Provider		BY
1 Door Position Switch	By Security Provider		BY
1 Door Contact	By Security Provider		BY
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

NOTE: Mounting boxes for hardware is to be provided by the Gate Mfg.

**SET #104**

1 Elec In Ground Swing Operator	ED400IG		DM
1 In Floor Door Closer	BTS 75/G BF	626	DM
1 Keypad	By Security Provider		BY
2 Push/Pull Set	1732 34" N-MD	630	TR
	NOTE: Provide fasteners for 1/2" glass		
2 Door Position Switch	By Security Provider		BY
1 Power Supply	PS 531RF		DM
1 Threshold	279A	AL	RS
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

NOTE: Operational description to be determined by security provider. Magnetic locks are to be tied into the fire alarm system. Magnetic locks are fail safe. Coordinate electrical requirements with related trades.

**SET #105**

1 Elec. Hinge	CE CEFBB179 4 1/2 X 4 1/2 18 4' LONG WIRES	26D	ST
2 Hinges	FBB179 4 1/2 X 4 1/2 NRP	26D	ST
1 Electro-mech Lock	45HW-7DEU3R PATD	626	BE
1 Rim Cylinder	1E-72 PATD R704	626	BE
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689	NO
1 Floor Dome Stop	443	626	RO
1 Card Reader	By Security Provider		BY
1 Door Position Switch	By Security Provider		BY
1 Door Contact	By Security Provider		BY
1 Power Supply	PS160		PR
1 Gasketing	5050 B @ Head and Jambs		NA
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

NOTE: Card Reader unlocks electric lock allowing entry. Coordinate electrical requirements with related trades and sections.

**SET #106**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D ST
1 Lockset	45H-7D3R PATD	626 BE
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689 NO
1 Floor Dome Stop	443	626 RO
3 Door Silencers	608	GRY RO

**SET #107**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D ST
1 Lockset	45H-7R3R PATD	626 BE
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689 NO
1 Floor Dome Stop	443	626 RO
3 Door Silencers	608	GRY RO

**SET #108**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D ST
1 Lockset	45H-7AB3R PATD	626 BE
1 Floor Dome Stop	443	626 RO
3 Door Silencers	608	GRY RO
1 Door Contact	By Security Provider	BY

**SET #109**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D ST
1 Lockset	45H-7R3R PATD	626 BE
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689 NO
1 Floor Dome Stop	443	626 RO
3 Door Silencers	608	GRY RO

**SET #110**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D ST
1 Privacy Set	45H-0L3R	626 BE
1 Door Closer	8501SN (REGULAR ARM) (AL)	689 NO
3 Door Silencers	608	GRY RO

**SET #111**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D ST
1 Exit Device	3310-M1-7136	628 AR
1 Set End Caps	For 3300-Ser. Exit Device (to match)	628 AR
1 Elec Entry Trim	3080E-02-8-33-35-M (For Exit Device) 12VDC,FS	630 AR
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689 NO
1 Floor Dome Stop	443	626 RO
1 Card Reader	By Security Provider	BY
1 Door Position Switch	By Security Provider	BY
1 Gasketing	5050 B @ Head and Jambs	NA
1 Wiring Diagram	ALL ELECTRIFIED ITEMS	

**SET #112**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D ST
1 Lockset	45H-7D3R PATD	626 BE
1 Floor Dome Stop	443	626 RO
3 Door Silencers	608	GRY RO

**SET #113**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset	45H-7D3R PATD	626	BE
1 Door Closer	8501SN (REGULAR ARM) (AL)	689	NO
1 Floor Dome Stop	443	626	RO
3 Door Silencers	608	GRY	RO

**SET #114**

1 Elec. Hinge	CE CEFBB179 4 1/2 X 4 1/2 18 4' LONG WIRES	26DST	
2 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Electro-mech Lock	45HW-7DEU3R PATD	626	BE
1 Door Closer	8501SN (REGULAR ARM) (AL)	689	NO
1 Floor Stop	443	626	RO
1 Card Reader	By Security Provider		BY
1 Door Contact	By Security Provider		BY
1 Door Position Switch	By Security Provider		BY
1 Power Supply	PS160		PR
3 Door Silencers	608	GRY	RO
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

NOTE: Card Reader unlocks electric lock allowing entry. Coordinate electrical requirements with related trades and sections.

**SET #115**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset	45H-7D3R PATD	626	BE
1 Door Closer	8501SN (REGULAR ARM) (AL)	689	NO
1 Floor Dome Stop	443	626	RO
1 Gasketing	5050 B @ Head and Jambs		NA

**SET #115A**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset	45H-7D3R PATD	626	BE
1 Door Closer	8501SN (REGULAR ARM) (AL)	689	NO
1 Floor Dome Stop	443	626	RO
1 Gasketing	5050 B @ Head and Jambs		NA
1 Door Contact	By Security Provider		BY

**SET #116**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset	45H-7R3R PATD	626	BE
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689	NO
1 Floor Dome Stop	443	626	RO
1 Door Position Switch	By Security Provider		BY
1 Gasketing	5050 B @ Head and Jambs		NA
1 Wiring Diagram	ALL ELECTRIFIED ITEMS		

NOTE: Coordinate electrical requirements with related trades and sections

**SET #117**

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Lockset	45H-7D3R PATD	626	BE
1 Door Closer	PR8501SN (PAR RIGID ARM) (AL)	689	NO
1 Gasketing	5050 B @ Head and Jambs		NA

## SECTION 088000

### GLASS AND GLAZING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the glass and glazing as shown on the drawings and/or specified herein, including but not limited to glazing of the following:
  - 1. Windows.
  - 2. Doors.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Hollow metal doors and frames - Section 081113.
- F. Windows - Section 085200.
- G. Framed mirrors - Section 102800.

##### 1.4 REFERENCES

- A. Comply with the recommendations of the following references unless more stringent requirements are indicated herein.
  - 1. FGMA Publications: FGMA Glazing Manual.
  - 2. AAMA Publications: AAMA TIR-A7 Sloped Glazing Guidelines and Glass Design for Sloped Glazing.
  - 3. LSGA Publications: LSGA Design Guide.

4. SIGMA Publications: TM-3000 Vertical Glazing Guidelines and TB-3001 Sloped Glazing Guidelines.
5. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201.
6. 16 CFR 1201, Safety Standards for Architectural Glazing, Sealed Insulating Glass Manufacturing Association.
7. ASTM C 920, Elastomeric Joint Sealant.
8. SAFETY ANSI Z97.1.
9. Fire Resistant ASTM E 152.
10. Insulating Glass Criteria - IGCC International Glass Cert. Council.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- C. Glass Design: Glass thicknesses indicated on drawings and/or specified herein are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
  1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
    - a. Specified Design Wind Loads: 30 psf or greater if required by Code.
  2. Probability of Breakage for Vertical Glazing:
    - a. 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
    - b. 1 lite per 1000 for lites installed 15 degrees from the vertical and under wind action.

- c. Load Duration: 60 seconds or less.
- 3. Maximum Lateral Deflection: For glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/100 times the short side length or 0.5", whichever is less.
- 4. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - a. Temperature Change (Range): 120 deg. F ambient; 180 deg F, material surfaces.
- 5. Thermal Solar Performance: See Article 2.2 herein.
- D. Glass units shall be annealed, heat strengthened, fully tempered or laminated where required to meet wind and/or snow loads and safety glazing requirements, as shown, specified or recommended by the glass fabricator and as required by the prevailing Building Code.

#### 1.6 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  - 2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  - 5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.

- B. Product Data: Submit manufacturer's printed product data, specifications, standard details, glazing instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements, including performance requirements.
- C. Submit compatibility and adhesion test reports from sealant manufacturer indicating materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials including insulation units.
- D. Initial Selection Samples: Submit samples of each glass and glazing material showing complete range of colors, textures, and finishes available for each material used.
- E. Verification Samples: Submit representative samples of each glass and glazing material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide glass samples having minimum size of 144 sq. in. and 6 in. long samples of sealants and glazing materials; all samples shall bear the name of the manufacturer, brand name, thickness, and quality.
- F. Calculations: Provide wind load charts, calculations, thermal stress analysis, and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied. Document shall be signed and sealed by a Professional Engineer licensed in the State of New York
- G. Test Reports: Provide certified reports for specified tests.
- H. Warranties: Provide written warranties as specified herein.

#### 1.7 QUALITY ASSURANCE

- A. Source: For each glass and glazing type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.
- B. Installer: A firm with a minimum of three years experience in type of work required by this Section and which is acceptable to manufacturers of primary materials; and with a successful record of in-service installations similar in size and scope to this Project.
- C. Glass Thickness: Glass thicknesses shown on drawings and/or specified herein are minimum thicknesses. Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
  - 1. GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide."
  - 2. IGMA Publications: IGMA TM-3000, "Vertical Glazing Guidelines for Sealed Insulating Glass Units."

- E. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
- F. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
  - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council.
  - 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.
- H. Insulating Glass Certification Program: Permanently marked on spacers with appropriate certification label of the following testing and inspecting agency:
  - 1. Insulating Glass Certification Council.
  - 2. Associated Laboratories, Inc.
  - 3. Insulating Glass Manufacturers Alliance.
- I. Manufacturer shall be ISO 9001-2000 Certified.

#### 1.8 TESTS

- A. Preconstruction Sealant Test: Submit samples of materials to be used to glazing sealant manufacturer to determine sealant compatibility. Include samples of glass, gaskets, glazing materials, framing members, and other components and accessories of glazing work. Test in accordance with ASTM C 794 to verify what type of primers (if any) are required to ensure sealant adhesion to substrates.
  - 1. Submit minimum of nine pieces of each type and finish of framing member, and nine pieces of each type, class, kind, condition, and form of glass, including monolithic, laminated, and insulating glass for adhesion tests.
  - 2. Provide manufacturer's written report and recommendations regarding proper installation.

1.9 PROJECT CONDITIONS

- A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within limits established by manufacturers of materials and products used.
- B. Temperature Limits: Install sealants only when temperatures are within limits recommended by sealant manufacturer, except, never install sealants when temperatures are below 40 deg. F.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and GANA Manual.
  - 1. Protect materials from moisture, sunlight, excess heat, sparks and flame.
  - 2. Sequence deliveries to avoid delays, but minimize on-site storage.

1.11 WARRANTIES

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the City of New York may have under the Contract Documents.
- B. Manufacturer's Special Project Warranty on Coated Glass Products: Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, within specified warranty period indicated below, replacements for those coated glass units which develop manufacturing defects. Manufacturing defects are defined as peeling, cracking or deterioration in metallic coating due to normal conditions and not due to handling or installation or cleaning practices contrary to glass manufacturer's published instructions.
  - 1. Warranty Period: Manufacturer's standard but not less than five (5) years after date of substantial completion.
- C. Manufacturer's Special Project Warranty on Insulating Glass: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure of the hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided the manufacturer's instructions for handling, installing, protecting and maintaining units have been complied with during the warranty period.
  - 1. Warranty Period: Manufacturer's standard but not less than ten (10) years after date of substantial completion.

D. Manufacturer's Special Project Warranty on Laminated Glass: Manufacturer's standard form, made out to the City of New York and signed by laminated glass manufacturer agreeing to replace laminated glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty period five (5) years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS/FABRICATORS

A. All glass and glazing used at the exterior of the Project shall be manufactured by the same manufacturer. The same manufacturer and the same furnace shall be used for all tempered and heat strengthened glass used throughout the project. Acceptable manufacturers include the following:

1. PPG Industries.
2. Guardian Industries.
3. Pilkington.
4. AFG.
5. JE Berkowitz, LP.
6. Viracon.

### 2.2 GLASS MATERIALS AND PRODUCTS

- A. Glass: Glass for guard rails, stair rails and entry vestibule shall be clear low-iron glass, Starphire by PPG or equal.
- B. Clear Float Glass: ASTM C 1036, Type I (Transparent, Flat), Class 1 (Clear), Quality q3, minimum 1/4" thick.
- C. Clear Tempered Glass: ASTM C 1048, Condition A (Uncoated), Type I (Transparent, Flat), Class 1 (Clear), Quality q3, Kind FT, minimum 1/4" thick. Tempered glass must be certified by SGCC to meet applicable standards. Tempered glass shall also conform to the following:
1. Length and Width: For 2.9 mm to 6.0 mm; +/-1.6 mm.
  2. Diagonal: +/- 3.0 mm.
  3. Edgework: Belt seaming or diamond wheels. 1.5 mm seam of upper and lower glass edges. No sharp edges.
  4. Corners: No more than 3.0 mm from square.

5. Float Glass Defects: Must meet the requirements of ASTM C 1036. The most common defects are scratches, stones gaseous bubbles and edge chips. Tables in the glass standards have limits for size/quantity of defects.
  6. Tempered glass shall have a minimum surface compression of 10,000 psi.
  7. Tempered glass to be heat-treated by horizontal (roller hearth) process with inherent roller-wave distortion parallel to the bottom edge of the glass when installed.
  8. Flatness Tolerances
    - a. Roller-Wave or Ripple: The deviation from flatness at any peak shall be targeted not exceed 0.003" as measured per peak to valley for 1/4" (6mm) thick glass.
    - b. Bow and Warp: The bow and warp tolerances shall not exceed 1/32" per linear foot.
    - c. Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard.
- D. Low 'E' Coated Glass: As specified in Section 085200 and 057010.
- E. Laminated Safety Glass: Provide two glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conform to ASTM C 1172, and as follows:
1. Interlayer Color: Clear.
  2. Interlayer Material: Provide Monsanto "Saflex" or DuPont "Butacite," 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications.
  3. Minimum thickness of 1/4".
  4. Provide 3/4" laminated low iron glass (Starphire) complying with above.
- F. Insulating Glass: Insulated glass composition shall consist of 1/4" clear exterior lite of float (or tempered, where required) glass with Low E coating on No. 2 face, 1/2" air space and 1/4" clear interior lite of float (or tempered, where required) glass. Provide factory assembled units of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space, complying with ASTM E 2190, and as follows:
1. Sealing System: Dual Seal.
  2. Primary Sealant: Polyisobutylene.
  3. Secondary Sealant: Silicone, General Electric IGS 3204 or IGS 3100, or Dow Corning 982.
    - a. For structurally glazed IG units, secondary seal shall conform to ASTM C 1249.

4. Primary and secondary seals shall not contain voids and must be continuously bonded to the glass structure.
5. Spacer: Clear finish aluminum with welded, soldered, or bent corners, hollow tube types, filled with low nitrogen absorption desiccant.
6. Desiccant: Molecular sieve, silica gel, or blend of both.
7. Air Space Thickness: 1/2".
8. Glass Thickness: 1/4" minimum.
9. Units shall be certified for compliance with seal classification "CBA" by the Insulating Glass Certification Council (IGCC) or by IGMA, and tested in accordance with the above ASTM Test Methods.
10. Insulating glass shall conform to the following tolerances:
  - a. Length and Width: + 3.0 mm/ -2.0 mm.
  - b. Diagonal: +/- 3.0 mm.
  - c. Thickness: As agreed +/- 1.0 mm.
  - d. Edge-Deletion of Coating: Minimum 8 mm wide. Width of deletion must be more than the width of the secondary seal. Silver layer(s) must be completely removed. Appearance must be uniform.
  - e. Primary PIB Seal: Must be complete with no breaks. Appearance must be uniform. PIB bead must overlap coating. No visible bright line when glass is viewed in transmission. The width of the PIB bead shall be 4.0 mm + 3.0/ - 1.5 mm.
  - f. Secondary Seal: Nominal 6 mm + 3.0/ - 1.5 mm. The minimum width of the secondary silicone seal for IG units that are glazed structurally must be determined according to ASTM C 1249. The secondary seal must be uniformly applied without bubbles, cavities or gaps. Avoid excess sealant that will need to be trimmed off later.
11. Additional requirements and properties for primary and secondary insulating glass seals and spacers:
  - a. Insulating glass unit hermetic seal to consist of butyl primary and silicone secondary seals with bent, welded, or soldered interpane spacer corners; keyed corners are not acceptable unless also soldered or welded. Spacers shall be aluminum or stainless steel. Locate spacer joint at the top or sides of the units, but in no instances at the sill. Design units to minimize the number of spacer joints. Provide solid keys, embedded in butyl sealant on all four sides, at spacer joints.
  - b. Hermetic seals must be continuous and intimately bonded to both lites of glass. Provide primary seal of uniform depth with a nominal width of 1/8 to 3/16 in. Hermetic seals shall not be contaminated with debris, fingerprints, or other foreign matter and shall not contain voids or air pockets that decrease the width of the seal below the minimum widths listed in these Specifications, or that breach the seal. The width of the primary seal shall

not be less than 1/16 in., and the total cumulative length of the primary seal between 1/16 in. and 1/8 in. shall be less than 12 in. in any one insulating glass unit. The primary seal shall not have a reduced thickness at the corners. An increased thickness of the primary seal at the corners is acceptable.

- c. Provide secondary seal of uniform depth with a nominal width of 1/4 in. Provide a total width of the primary and secondary seal of 1/2 in. Units shall carry CBA rating as established by ASTM E774 and shall meet SIGMA 65-7-2, latest edition. Units shall not contain breather or capillary tubes or similar penetrations.
  
- G. Wire Glass: ASTM C 1036, UL Listed, Fire Rated polished transparent wire glass complying with ANSI Z97.1. Provide Type II (Patterned and Wired Glass), Class 1 (Clear), Quality q8 (Glazing), Form 1 (Polished Both Sides), and as follows:
  - 1. Thickness: 1/4" unless otherwise indicated or required.
  - 2. Square Pattern: Mesh M2.
  
- H. Fire-Rated Glazing Material: Proprietary product in the form of clear flat sheets of 3/16" nominal thickness weighting 2.5 lb./sq. ft., and as follows:
  - 1. Fire Protection Rating: As required by Code for the fire rated opening in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Product: "Premium FireLite" by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products.

### 2.3 GLAZING MATERIALS AND PRODUCTS

- A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulating glass sealants, with laminated glass interlayers, and with any other surfaces in contact.
  
- B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:
  - 1. Dow Corning 795.
  - 2. General Electric Silglaze N 2500 or Contractors SCS-1000.
  - 3. Tremco Spectrem 2.
  
- C. Weather Seal Sealant: Provide non-acid curing sealant with movement range  $\pm$  50%, ASTM C 719. Provide one of the following:
  - 1. Dow Corning 795.
  - 2. General Electric Silpruf.
  - 3. Tremco Spectrem 2.

- D. Backer Rod: Closed cell non-gassing polyethylene rod with rod diameter 25% wider than joint width.
- E. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of  $75 \pm 5$  for hollow profile, and  $60 \pm 5$  for solid profiles, ASTM C 864.
- F. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A  $40 \pm 5$ , and 20% to 35% compression, ASTM C 509; Type II.
- G. Preformed Glazing Tape: Provide solvent-free butyl-polyisobutylene rubber with 100% solids content complying with ASTM C1281 AAMA A 800 with integral continuous EPDM shim. Provide preformed glazing tape in extruded tape form. Provide Tremco "Polyshim II" or approved equal.
- H. Setting Blocks: Provide 100% or silicone blocks with Shore A hardness of 80-90. Provide products certified by manufacturer to be compatible with silicone sealants. Length to be not less than 4". Width for setting blocks to be  $1/16$ " more than glass thickness and high enough to provide the lite recommended by glass manufacturer. When thickness of setting block exceeds  $3/4$ " the glass manufacturer must be consulted for sizes and configuration. In a vented system, setting block shall be designed so as to not restrict the flow of water within the glazing rabbet to the weep holes.
  - 1. Shims: For shims used with setting blocks, provide same materials, hardness, length and width as setting blocks.
  - 2. Structural Silicone Glazing: Provide silicone setting blocks where structural silicone occurs at sills and at insulating units with silicone edge seals.
- I. Edge Blocks: Provide neoprene or silicone as required for compatibility with glazing sealants. Provide blocks with Shore A hardness of  $55 \pm 5$ .
- J. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.
- K. Miscellaneous Glazing Materials: Provide sealant backer rods, primers, cleaners, and sealers of type recommended by glass and sealant manufacturers.

#### 2.4 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.
- C. Grind smooth and polish exposed glass edges.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep system.
  - 3. Minimum required face or edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

### 3.3 GENERAL GLAZING STANDARDS

- A. Install products using the recommendations from the manufacturer of glass, sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those in the "GANA Glazing Manual".
- B. Verify that Insulating Glass (IG) Unit secondary seal is compatible with glazing sealants.
- C. Install glass in prepared glazing channels and other framing members.
- D. Install setting blocks in rabbets as recommended by referenced glazing standards in "GANA Glazing Manual" and "IGMA Glazing Guidelines".
- E. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by "GANA Glazing Manual".
- F. Provide weep system as recommended by "GANA Glazing Manual".
- G. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.
- H. Distribute the weight of glass unit along the edge rather than the corner.
- I. Comply with manufacturers and referenced industry standards on expansion joint and anchors; accommodating thermal movement; glass openings; use of setting blocks, edge, face, and bite clearances; use of glass spacers; edge blocks and installation of weep systems.
- J. Protect glass edge damage during handling and installation.

- K. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.
- L. Remove and replace glass that is broken, chipped cracked or damaged in any way.

### 3.4 GLAZING

- A. Glazing channel dimensions, as indicated on Shop Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead. Install setting blocks at the one greater points of each lite along the horizontal mullion.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

K. Flush Glazing

1. If the butt joint in the metal framing is in the vertical direction, the glazier shall run the tape initially on the head and sill members going directly over this joint. Should the butt joint in the metal framing run horizontally, tapes must first be applied to the jambs so that it crosses over the joint.
2. Each tape section shall butt the adjoining tape and be united with a tool to eliminate any opening.
3. Do not overlap the adjoining length of tape or rubber shim as this will prevent full contact around the perimeter of glass.

L. Off-Set Glazing

1. Where the glazing legs are off-set, the difference in the rabbet width shall be compensated by employing different glazing tapes with different diameter shims. The difference in shim shall be equal to the size of the off-set. The thinner tape shall be positioned first on the glazing leg closest to the interior. The thicker tape shall be cut to the exact length of the dimension between the applied tapes, and installed on the outermost glazing leg.
2. Immediately prior to setting glass, paper backing shall be removed. Apply a toe bead of sealant 6" in each direction, from each corner.
3. Locate setting blocks in the sill member at quarter points, or if necessary to within 6" of each corner. Setting blocks must be set equal distance from center line of the glass and high enough to provide the recommended bite and edge clearances.
4. Set edge block according to glass manufacturer's recommendations.
5. Set Glass: The glass shall be pressed firmly against the tape to achieve full contact.
6. In a vented system, apply a heel bead (air seal) of sealant around the perimeter of glass, between the sole of the I.G. unit and the base of the rabbet of the metal framing developing a positive bond to the unit and to the metal framing. The bead of the sealant shall be deep enough so that it will partially fill the channel to a depth of 1/4" between the glass edge and the base of the metal framing rabbet.
7. Interior stops shall be set, and glazing tape spline for the appropriate face clearance shall be rolled into place, compressing the glass to the shim within the glazing tape.

### 3.5 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant as recommended by glass manufacturer or glass frame manufacturer.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape where noted on approved shop drawings.

### 3.6 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

### 3.7 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

1. Exterior glazing gasket shall be set a minimum of 1/8" below exterior glazing stop to create a channel for sealant installation.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.8 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.
- E. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.
- F. Glass to be cleaned according to:
  1. GANA Glass Information Bulletin GANA 01-0300 – "Proper Procedure for Cleaning Architectural Glass Products".
  2. GANA Glass Informational Bulletin GANA TD-02-0402 – "Heat Treated Glass Surfaces are Different".
- G. Do not use razor blades, scrapers or metal tools to clean glass.

END OF SECTION

## SECTION 089000

### LOUVERS AND VENTS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the louvers and vents as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Aluminum louvers within window frame.
  - 2. Blank off panels.
  - 3. Bird screens.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Masonry - Section 042000.
- F. Sealant work - Section 079200.
- G. Louvers in metal doors - Section 081113.
- H. Louvers connected to ductwork - Division 23.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions,

or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter or permanent damage to fasteners and anchors.
  - 1. Wind Load: Uniform pressure (velocity pressure) of 30 lbf/sq. ft., acting inward or outward.
- C. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects.
  - 1. Temperature Change (Range): 120 deg. F., ambient; 180 deg. F, material surfaces.
- D. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
- E. Field Measurements: Verify size, location and placement of louver units prior to fabrication.
- F. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  - 2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC)

limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Product Data: Submit manufacturer's specifications, certified test data, where applicable, and installation instructions for required products, including finishes.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.
- D. Samples: Submit six (6) inch square samples of each required finish. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, include two (2) or more units in each sample showing limits of such variations.

#### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

#### 1.7 WARRANTY

- A. Finish shall be warranted for a period of 20 years, starting from date of Substantial Completion of the Project.

### PART 2 PRODUCTS

#### 2.1 LOUVER MATERIAL

- A. Provide storm resistant fixed horizontal louver (no mullions), to fit within window frame as manufactured by Construction Specialties or equal made by Airolite, Airline Products Co. or approved equal meeting these specifications.
- B. Material: Heads, sills, jambs and mullions to be one-piece structural aluminum members with integral caulking slot and retaining beads. Louver shall be designed to collect and drain water to exterior at sill by means of multiple gutters in blades and channels in jambs and mullions. Louvers to be supplied with 4" high by full depth sill flashings formed from minimum 0.050" thick aluminum. Sill flashings to have welded side panels. Louvers and sill flashings to be installed in accordance with the

manufacturer's recommended procedures to ensure complete water integrity performance of the louver system

C. AMCA Performance: A 4' x 4' unit shall conform to the following:

1. Free Area: 8.09 sq. ft.
2. Intake Pressure Drop at 900 fpm Free Area Velocity: 0.259 in. H<sub>2</sub>O.
3. Exhaust Pressure Drip at 900 fpm Free Area Velocity: 0.259 in. H<sub>2</sub>O.

D. Wind Driven Rain Performance: The louver test was based on a 39.370" x 39.370" core area. Unit tested at a rainfall rate of 3.0" per hour and with a wind directed to the face of the louver at a velocity 29.1 mph. The test data shall show the water penetration effectiveness rating at each corresponding ventilation rate.

1. Core Ventilation Rate: (ft/min)	0	108	200	300	403	480	600	719
2. Free Area Ventilation Rate (ft/min)	0	202	772	559	751	894	1117	1339
3. Rating Effectiveness	A	A	A	A	A	B	B	D
4. Effectiveness Rating	A=1 to 0.99		B=0.989 to 0.95		C=0.949 to 0.80		D=0.80 to 0	

E. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.
2. Custom color and gloss as selected by the Commissioner.

F. Louvers shall be furnished with 1/2" mesh, 0.063" diameter aluminum wire intercrimp bird screen secured in removable extruded aluminum frames.

G. Provide aluminum blank off panels behind louvers where shown on mechanical drawings, fabricated from 1/8" thick aluminum face sheets, finish to match louvers; reinforce as required to form rigid assembly. Blank off panels shall be insulated with thermafiber insulation of thickness needed to insure an R value of eleven (11).

- H. Fastenings: Fasteners for exterior application shall be stainless steel. Provide types, gauges and lengths to suit unit installation conditions. Use Phillips flat head machine screws for exposed fasteners, unless otherwise indicated.
- I. Anchors and Inserts: Use non-ferrous metal or hot dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- J. Bituminous Paint: SSPC-Paint 12 (cold applied asphalt mastic).

## 2.2 FABRICATION, GENERAL

- A. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.
- B. Include supports, anchorages, and accessories required for complete assembly.
- C. Provide sill extensions made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.
- D. Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where louvers and vents are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchorages which are to be embedded in masonry construction. Coordinate the delivery of such items to the project site.

### 3.3 INSTALLATION

- A. Locate and place louver units plumb, level and in proper alignment with adjacent work.
- B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.

- D. Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore finishes and prime coats of paint so that there is no evidence of corrective work. Return items which cannot be refinished in the field to the shop, make the required alterations, and refinish the entire unit, or provide new units, at Contractor's option.
- E. Protect aluminum surfaces from corrosion by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.
- F. Provide concealed gaskets, flashings, joint fillers and insulations, and install as the work progresses to make the installations weathertight.

END OF SECTION

## SECTION 090120

### PLASTER RESTORATION

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the plaster restoration work for existing ceilings and walls scheduled to remain as specified herein, including, but not limited to, the following:
  1. Contractor shall survey all areas where existing plaster is shown to remain, in order to verify extent of patch or repair. Scope of work to include plaster patching at all areas scheduled to receive new paint, plaster skim coat or wall covering.
  2. Cutting out and removing existing interior plaster surfaces where needed to repair existing gypsum plaster.
  3. Cutting out and removing existing plaster on walls and ceilings as required for installation of new work.
  4. Repair and patching cracks, spalls, delaminations, breaks, losses, chips, holes or other defects in gypsum plaster surfaces.
  5. Repair of existing ornamental plaster designs and moldings, including making molds of existing designs for replication elsewhere as indicated.
  6. Providing plaster accessories and associated Work.
  7. Providing new plaster to align with existing plaster at existing walls and ceilings.
  8. Application of skim coat of plaster over new and existing plaster ceilings and walls to remain.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Painting - Section 099000.

1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Conform to the following standards:
1. ASTM C 841 - Standard Specification For Installation of Interior Lathing And Furring.
  2. ASTM C 842 - Standard Specification For Application of Interior Gypsum Plaster.
  3. ASTM C 847 - Standard Specification For Metal Lath.
  4. ASTM C 28 - Standard Specification For Gypsum Plasters.
  5. ASTM C 631-81 - Standard Specification For Bonding Compounds For Interior Plastering.
  6. ASTM C 35 - Standard Specification For Inorganic Aggregates For Use In Gypsum Plaster.
  7. ASTM C 206 - Standard Specification For Finishing Hydrated Lime.
- C. Allowable Tolerances: All plaster repairs shall be keyed and feathered to exactly match and continue edges and contours of existing plaster work. Repairs shall be true and flat in connections with adjacent surfaces when checked with an 8 ft. straight edge; do not exceed 1/8-inch variation in 8 ft. for bow, warp, plumb, or level for flat and curved surfaces.
- D. Defects
1. Plastering with defects of such character as will mar the appearance of finished Work, or which is otherwise defective, shall be rejected, removed and replaced at the Contractor's expense.
  2. All ridges, ledges and visual irregularities shall be rejected, removed, and plaster replaced at the Contractor's expense.
  3. Any defects or irregularities of plaster restoration work telegraphing through paint shall be cause for rejection of the Work. The Contractor shall remove any subsequent work, remove and replace the defective or irregular plaster restoration work and have the subsequent work replaced by skilled workman in the appropriate trades, to the satisfaction of the Commissioner, at the Contractor's expense.

## 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Materials List: Before any materials are delivered to the job site, submit a complete list of all the materials proposed to be furnished and installed.
- C. Product Data: Submit manufacturer's product data for plaster materials, lath, metal support components, and accessories; including manufacturer's current recommendations as to methods and installation.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer.
- B. Store materials inside, under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes. Neatly stack gypsum lath flat to prevent deformation.
- C. Handle gypsum lath to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.

## 1.7 PROJECT CONDITIONS

- A. Environmental Requirements, General: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after application of plaster.

- B. Ventilation: Ventilate building spaces in compliance with ASTM C 842 and as required to remove water in excess of that required for hydration of plaster. Begin ventilation immediately after plaster is applied and continue until it sets.
- C. Protection: Restoration of existing plaster shall be done in such manner as not to cause damage to contiguous work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Gypsum Plaster: ASTM C 28. Neat plaster for hand application of scratch coat over metal lath and concrete shall contain not less than 0.01 percent by weight of synthetic or vegetable fibers or not less than 0.02 percent by weight of mineral fibers.
- B. Bond Compound: A plaster bonding compound having special bonding properties shall be used for application to concrete surfaces that have been sufficiently roughened to provide a mechanical key. The Bond Compound shall be "Plaster Weld" made by Larsen Mfg. Co. or approved equal. It shall be mixed and applied in strict accordance with the Manufacturer's directions.
- C. Plaster Crack Patching Compound: Provide "Sheetrock All Purpose Joint Compound Ready Mixed" as manufactured by U.S. Gypsum Co., or approved equal made by DAP; apply per manufacturer's recommendations.
- D. Special Finishing Hydrated Lime: ASTM C 206. Lime putty shall be made from special finishing hydrated lime, machine mixed with water to form a putty and allowed to stand for at least 15 minutes before using. Approved measures shall be taken to protect the putty from sun and to prevent excessive evaporation when stored.
- E. Sand: ASTM C 35. Graduation of natural or manufactured sand for plaster shall be as follows:

U.S. Standard Sieve Size No.	Percentage Retained	
	Max.	Min.
4	0	0
8	10	0
16	40	10
30	65	30
50	100	95
100	100	95

- F. Water: Clean, fresh, potable, and free from injurious amounts of oils, acids, alkalis and organic matter injurious to the plaster.
- G. Metal Accessories: Grounds and casing corner beads shall be zinc-coated sheet steel, 26 ga. or heavier, with expanded or perforated flanges or clips so shaped and fabricated as to permit complete embedment in the plaster.

## 2.2 MIXING OF PLASTER

- A. Mix and apply plaster in accordance with the directions of the manufacturer.
- B. Texture of finishing coat shall match existing plaster.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where plaster work is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Commissioner.

### 3.2 GENERAL

- A. Sequence plaster installation properly with the installation and protection of other work, so that neither will be damaged by the installation of other work.
- B. Cut out and replace all unbonded spots. Build in the work in others and do all cutting and patching of plaster in this connection. Where abutting other built-in materials, plaster shall be finished tightly against them and neatly trimmed, unless otherwise indicated.
- C. Plaster thicknesses indicated shall be considered as a minimum; plaster shall be of such thickness required to plumb and square wall surfaces so that plaster is flush with adjacent surfaces.
- D. Replicate, repair and restore flat wall plaster as indicated. Replicate repair and restore or move existing decorative moldings, applied panels, grooving and cast decoration as indicated.
- E. Plaster repairs shall be executed edge to edge in long strips or large areas for each separate coat. Where breaks are necessary lap new work over adjoining work.
- F. Bring finished surfaces of plaster to true planes. When complete surface shall be clean, free from blisters, pits, discoloration, cracks or other defects. In all cases the plastering throughout is to be delivered clean and perfect in every respect.

### 3.3 PREPARATION

- A. Inspect all surfaces to be plastered before beginning Work and correct all defects which will affect the proper execution of this Work.
- B. Carefully remove all soft, broken, loose or flaking plaster back to substrate and to solid adjacent plastering, making clean and sharp edges; cut back the existing plaster at an angle so that the patching will key properly and blend in with the existing surfaces at both sides of the crack. Where necessary, partially remove existing metal lath, leaving enough lath exposed to tie to new lath. Sweep masonry and lath clean and dampen immediately prior to replastering. Replace deteriorated wood lath with new wood lath to match existing. Concrete substrates shall be roughened to receive scratch or brown

coats. Keys in masonry and metal lath substrates shall be cleaned of all existing plaster. Masonry substrates shall be prewetted to prevent excessive suction and too rapid drying. Join new work and make flush with contiguous work.

- C. Cracks: Hairline cracks, random cracking and checking shall be repaired using plaster crack patching compound specified herein.
- D. Bonding compound shall be applied to all plaster, concrete and masonry surfaces for all plaster repairs. Application shall be in strict accordance with manufacturer's written recommendations and first and brown coats shall be applied directly over bonding compound.
- E. All preparation shall be done with compatible materials and methods that will not compromise the integrity of the plasters, and will not telegraph through finished surfaces.

#### 3.4 GYPSUM PLASTER ON METAL AND WOOD LATH, AND CONCRETE

- A. For Metal and Wood Lath Apply in Three (3) Coats: Scratch Coat, brown coat and finish coat.
- B. For Concrete Substrates Repair With Bond Plaster: As noted above and in strict accordance with the manufacturer's instructions.
- C. For Clay Tile and Masonry: Apply in two (2) coats: Brown coat and finish coat.
- D. Scratch Coats: Apply with sufficient material and pressure to form full bond with solid base materials. Scratch the surface to form a bond for the brown coat.
- E. Brown Coats: Do not apply brown coat until after the scratch coat has hardened, and not less than 24 hours after application of the scratch coat. All joints in brown coat plaster shall be lap joints. After drying, all shrinkage cracks shall be cut out and filled with scratch coat plaster.
- F. Mix scratch and brown coats shall be mixed in the proportions of 100 lbs. gypsum neat plaster to 2-1/2 cu. ft. of sand. Scratch and brown coats of fibered gypsum plaster shall be mixed in the proportions of 100 lbs. fibered gypsum plaster to one cu. ft. of sand.
- G. Finish Coats: Gypsum gauging plaster finish. Mix in the proportion of one part calcined gypsum, to 3 parts of lime putty by volume. Apply bonding compound to existing base coat and then apply finish coat over base coat of gypsum plaster. The finish shall be allowed to draw a few minutes and then shall be well troweled with water to a smooth finish, free from blemishes. The thickness of finish coat shall be from 1/16" to 1/8" and total thickness of gypsum plaster shall be as indicated but no less than 5/8".
  - 1. At plaster ceilings to remain, apply bonding agent per manufacturer's instructions followed by skim coat of finish plaster applied 1/16" to 1/8" thick.

#### 3.5 FINISHING

- A. Cut, patch, point-up and repair plaster as necessary to restore shrinkage cracks, dents and imperfections. Repair or replace work to eliminate blisters, buckles, excessive

crazing and check cracking, dry-outs, efflorescence, sweat-outs and similar defects, and where bond to the substrate has failed. Patched surfaces in existing plaster surfaces shall be imperceptible.

- B. Sand smooth-troweled finishes lightly to remove trowel marks and arrises.
- C. Remove temporary protection and enclosure of other work. Remove plaster from other surfaces which are not to be plastered. Repair floors, walls and other surfaces which have been stained, marred or otherwise damaged during the plastering work. When plastering work is completed, remove unused materials, containers and equipment and clean floors of plaster debris.
- D. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures plaster work being without damage or deterioration at time of substantial completion.

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## SECTION 092713

### GLASS-FIBER-REINFORCED GYPSUM FABRICATIONS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete interior glass-fiber-reinforced gypsum fabrications as shown on drawings and/or specified herein including, but not limited to the following
  1. Factory-molded, glass-fiber-reinforced gypsum fabrications for interior use as column covers, to match existing adjacent columns.
  2. Steel framing for direct support of glass-fiber-reinforced gypsum fabrications.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 08119.
- E. Carpentry – Section 062000.
- F. Gypsum drywall – Section 092900.
- G. Painting – Section 099000.

##### 1.4 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 –1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.

3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Product Data: For each type of glass-fiber-reinforced gypsum fabrication indicated. Include construction details, material descriptions, weights, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings: Show profiles, thicknesses, finishes, joints, ornamentation, installation tolerances, and anchorage details. Indicate attachment methods, embedded supports, reinforcement, fabrication methods, joint treatments, clearances, and supports.
1. Show connection to suspension system and cutouts for sprinklers, diffusers, grilles, speakers, and lighting fixtures.
- D. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
1. Ceiling suspension assembly members.
  2. Method of attaching hangers to glass-fiber-reinforced gypsum fabrications and to building structure.
  3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and moldings.
- E. Samples: For each exposed product in each profile and size required, and as follows:
1. Linear Moldings: 2-foot long section with finished joint. Show complete pattern.
  2. Nonlinear Shapes: Full-size unit.
- F. Installer Qualification Data: To demonstrate capabilities and experience of Installer. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current glass-fiber-reinforced gypsum fabrications comply with ASTM C 1355 requirements.

## 1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. **Installer Qualifications:** An experienced installer who has completed glass-fiber-reinforced gypsum fabrication installations similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. **Testing Agency Qualifications:** An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- D. **Fire-Test-Response Characteristics:** Provide glass-fiber-reinforced gypsum fabrications with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another independent testing and inspecting agency acceptable to authorities having jurisdiction:
1. Flame Spread: 25 or less.
  2. Smoke Developed: 450 or less.
- E. **Mockups:** Before installing glass-fiber-reinforced gypsum fabrications, build mockups for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Commissioner.
  2. Notify Commissioner seven days in advance of dates and times when mockups will be constructed.
  3. Demonstrate the proposed range of aesthetic effects and workmanship.
  4. Obtain Commissioner's approval of mockups before starting glass-fiber-reinforced gypsum fabrication.
  5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  6. Demolish and remove mockups when directed.
  7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Ship and store glass-fiber-reinforced gypsum fabrications in factory-wrapped crates, packaged to keep units dry. Avoid cracking, warping, or staining the units.
- B. Comply with manufacturer's written instructions for storage, temperature, and humidity requirements.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install glass-fiber-reinforced gypsum fabrications until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Acclimatize glass-fiber-reinforced gypsum fabrications to ambient temperature and humidity of spaces in which they will be installed. Remove packaging and move units into installation spaces not less than 48 hours before installing them.
- C. Field Measurements: Where glass-fiber-reinforced gypsum fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate layout and installation of glass-fiber-reinforced gypsum fabrications and suspension system components with other construction, including ceilings, light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Architectural Reproductions Inc.
  - 2. Casting Designs, Inc.
  - 3. Formglas Inc.
  - 4. Molded Fiber Glass/Union City.
  - 5. Plastrglas.

## 2.2 STEEL FRAMING COMPONENTS

- A. Framing Components: As indicated and that comply with steel framing components specified in Section 092900 – Gypsum Drywall.
- B. Cast-in-Place and Postinstalled Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.
  - 1. Cast-in-place type designed for attachment to concrete forms.
  - 2. Chemical anchor.
  - 3. Expansion anchor.
- C. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190 conducted by a qualified independent testing agency.
- D. Wire Ties: ASTM A 641, Class 1 zinc coating, soft temper, 0.062 inch thick.
- E. Wire Hangers: ASTM A 641, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- F. Hanger Rods: Mild steel and zinc coated or protected with rust-inhibitive paint.
- G. Flat Hangers: Mild steel and zinc coated or protected with rust-inhibitive paint.
- H. Channels: Cold-rolled steel, 0.0598-inch minimum thickness of base (uncoated) metal and 7/16-inch-wide flanges, and as follows:
  - 1. Carrying Channels: 2 inches deep, 590 lb./1000 feet, unless otherwise indicated.
  - 2. Furring Channels: 3/4 inch deep, 300 lb./1000 feet, unless otherwise indicated.
  - 3. Finish: ASTM A 653, G60 hot-dip galvanized coating.
- I. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch-wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
  - 1. Thickness: 0.0329 inch, unless otherwise indicated.
  - 2. Depth: As indicated, or required to support assemblies and as shown on approved shop drawings.
  - 3. Protective Coating: ASTM A 653, G40 hot-dip galvanized coating.

- J. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing members securely to substrates.

## 2.3 GLASS-FIBER-REINFORCED GYPSUM FABRICATION MATERIALS

- A. Glass-fiber-reinforced Gypsum Fabrications: ASTM C 1355/C 1355M.
- B. Embedments: Cold-rolled steel channels with ASTM A 653, G60, hot-dip galvanized coating.
- C. Embedments: As standard with glass-fiber-reinforced gypsum fabrication manufacturer and as required for reinforcement and for anchorage to substrates and framing.

## 2.4 AUXILIARY MATERIALS

- A. Adhesives: As recommended in manufacturer's written instructions.
- B. Steel Drill Screws: Provide fasteners, complying with the following requirements, that are of sufficient length and size to securely fasten gypsum-reinforced fabrications to framing members:
  - 1. Screws complying with ASTM C 1002 for fastening glass-fiber-reinforced gypsum fabrications to steel members less than 0.033 inch thick.
  - 2. Screws complying with ASTM C 1002 for fastening glass-fiber-reinforced gypsum fabrications to wood members.
  - 3. Screws complying with ASTM C 954 for fastening glass-fiber-reinforced gypsum fabrications to steel members from 0.033 to 0.112 inch thick.
- C. Joint Treatment Materials: Provide materials complying with ASTM C 475 and with the recommendations of the manufacturers of both glass-fiber-reinforced gypsum fabrications and joint treatment materials for each application indicated.
- D. Control Joints: One-piece control joint with V-shaped slot and removable strip covering slot opening, formed from steel sheet zinc-coated by hot-dip process or from rolled zinc, and complying with ASTM C 1047.

## 2.5 FABRICATION

- A. Fabricate glass-fiber-reinforced gypsum units from molds constructed of rigid materials that will result in smooth-finished surfaces conforming to profiles, dimensions, and tolerances indicated, minimum shell thickness shall be 1/4". Provide units as large as practical to minimize joints.
- B. Remove units from molds and repair hollows, voids, scratches, and other surface imperfections.
- C. Material Compatibility: Fabricate glass-fiber-reinforced gypsum fabrications with surface characteristics required for a high-gloss paint finish.

- D. Embedments: Incorporate embedments so they develop the full strength of glass reinforced gypsum fabrications. Cover embedments with glass-fiber-reinforced gypsum composite not less than 3/16 inch thick.
- E. Connection Hardware: Custom designed and fabricated to support and connect glass reinforced gypsum fabrications to hangers, support framing, and substrates.
- F. Dimensional Tolerances of Units: As follows:
  - 1. Factory-Finished Edge Straightness: Plus or minus 1/8 inch.
  - 2. Plane Surface Straightness: Plus or minus 1/8 inch.
  - 3. Overall Assembled Length and Width: Plus or minus 1/8 inch per 10 feet.
  - 4. Chords, Radii, and Diameters: Plus or minus 1/8 inch.
  - 5. Squareness: Not more than 1/4-inch difference between diagonals in 16 sq. ft.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for environmental conditions, installation tolerances, and other conditions affecting performance of glass-fiber-reinforced gypsum fabrications.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 STEEL FRAMING INSTALLATION

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with details indicated. Select framing components of type, size, and spacing needed to support weight of glass-fiber-reinforced gypsum fabrications and to maintain erection tolerances.
- B. Supplementary Framing, Blocking, and Bracing: Install supplementary framing as required not only to support glass-fiber-reinforced gypsum fabrications but also fixtures and other items penetrating glass-fiber-reinforced gypsum fabrications.

#### 3.3 GLASS-FIBER-REINFORCED GYPSUM FABRICATION INSTALLATION

- A. Install glass-fiber-reinforced gypsum fabrications level, plumb, true, and aligned with adjacent materials. Use concealed shims where required for alignment.
- B. Predrill fastener holes in glass-fiber-reinforced gypsum fabrications. Clean fastener holes to remove dirt and oil.
- C. Attach glass-fiber-reinforced gypsum fabrications to framing and substrates with steel drill screws. Do not use pneumatic staple guns. Countersink screw heads below adjoining finished surface.

- D. Fasten as required to comply with dimensional tolerances and not less than 5/16 inch from edge to end.
- E. Cover screw heads with joint compound to produce flush, smooth, and level finished surfaces.
- F. Attach glass-fiber-reinforced gypsum fabrications at joints with adhesive, and band or brace together until adhesive is cured. Cure adhesive according to glass-fiber-reinforced gypsum fabrication manufacturer's written instructions.
- G. Install control joints where indicated.
- H. Joint Finishing: Comply with ASTM C 840 for Level 5 finish.

#### 3.4 ERECTION AND LOCATION TOLERANCES

- A. Erection Tolerances: Install glass-fiber-reinforced gypsum fabrications so each unit complies with the following dimensional requirements:
  - 1. Plane Alignment (Panel to Panel): 1/16 inch.
  - 2. Variation from Plumb: Plus or minus 1/8 inch per 10 feet.
  - 3. Variation from Straightness: Plus or minus 1/4 inch per 25 feet.
  - 4. Assembly Deflection: Not greater than the length of the assembly divided by 240.
  - 5. Joint Alignment: Not more than 1/8 inch.
  - 6. Joint Width: Not more than 3/8 inch.

END OF SECTION

## SECTION 092900

### GYPSUM DRYWALL

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the gypsum drywall as shown on the drawings and/or specified herein, including, but not limited to, the following:
  1. Gypsum board work for partitions, ceilings, column enclosures, furring, and elsewhere where gypsum drywall work is shown on drawings.
  2. Metal supports for gypsum drywall construction.
  3. Acoustical insulation for gypsum drywall work.
  4. Sealant for gypsum drywall work.
  5. Concealed metal reinforcing for attachment of railings, toilet partitions and other items supported on drywall partitions and walls.
  6. Taping and finishing of drywall joints.
  7. Installing rings and frames in drywall surfaces for grilles, registers and lighting fixtures.
  8. Gypsum wallboard cants at beams and other projections over 2" deep in elevator shafts where adjoining wall is of gypsum wallboard construction.
  9. Gypsum shaftwall construction.
  10. Bracing and connections.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.

- E. Hollow metal door frames - Section 081113.
- F. Access doors - Section 083113.
- G. Painting - Section 099000.
- H. Elevators - Division 14.
- I. Rings for grilles, registers and light fixtures - Division 23 and 26.

1.4 ENVIRONMENTAL CRITERIA:

- A. Recycled Content: Gypsum wallboard shall contain recycled content material as follows:
  - 1. Paper Facings: Where feasible, a minimum of 100% post-consumer recycled paper content.
  - 2. Gypsum Cores: Where feasible, a minimum of 75% post-industrial recycled gypsum content (also called "synthetic gypsum" – from coal-fired power plants).
- B. The percentage of recycled content is based on the weight of the component materials.

1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  - 1. Steel studs, track, and miscellaneous framing shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials).
  - 2. Gypsum wallboard shall contain "synthetic" gypsum produced with a minimum of 75% post-industrial recycled content, if readily available.
  - 3. Certification of recycled content shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
  - 4. Steel framing and gypsum wallboard products harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED BUILDING Submittal Requirements of this Section.

5. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable
  6. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. The following standards, as well as other standards which may be referred to in this Section, shall apply to the work of this Section:
1. The Gypsum Construction Handbook, latest edition, USG.
  2. ASTM C 645 "Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels For Screw Application of Gypsum Board."
  3. ASTM A 568 "Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For."
  4. ASTM C 1396 "Standard Specification for Gypsum Board."
  5. ASTM C 475 "Standard Specification for Joint Treatment Materials For Gypsum Wallboard Construction."
  6. ASTM C 645 "Specification for Non-Structural Steel Framing Members."
  7. ASTM C 754 "Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products".
  8. ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board."
  9. ASTM C 919 "Standard Specification for Use of Sealants in Acoustical Applications."
  10. ASTM C 954 "Standard Specification for Steel Drill Screws For the Application of Gypsum Board or Metal Plaster Bases to Steel Studs From 0.033 in. to 0.112 in. in Thickness."
  11. ASTM C 1002 "Standard Specification for Steel Self-Piercing Tapping Screws For the Application of Gypsum Board."
  12. ASTM C 754 "Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Board Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs."
  13. ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber."
  14. ASTM C 1177 "Specification for Glass Mat Gypsum Substrate for Use at Sheathing."

15. ASTM C 1178 "Specification for Glass Mat Water Resistant Gypsum Backing Board."
  16. ASTM C 1278 "Specification for Fiber Reinforced Gypsum Panels."
- D. Allowable Tolerances: 1/32" offsets between planes of board faces, and 1/16" in 8'-0" for plumb, level, warp and bow.
- E. System Design Load
1. Provide drywall shaft systems for elevators designed and tested by manufacturer to withstand a lateral loading (air pressure) of 10 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
  2. Provide standard drywall wall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
    - a. Drywall assemblies with tile finish shall have a deflection limit of L/360.
  3. Provide drywall ceiling assemblies designed, fabricated and installed to have a deflection not to exceed L/360.
- F. Fire-Resistance Rating: Where gypsum drywall with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories, or to design designations in UL "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction, and compliant with UL Test #2079; criteria for cycle movement for all field height wall sections requiring allowance for vertical deflection within framing details.
- G. Installer: Firm with not less than 3 years of successful experience in the installation of specified materials.
- H. For projects located in New York City, comply with New York City Section 32-05 of Chapter 32 of Title 1 of the Official Compilation of the Rules of the City of New York regarding "Impact Resistant Stair and Elevator Enclosures" when such enclosures are of gypsum drywall construction.

#### 1.6 SUBMITTALS

- A. LEED BUILDING Submittal Requirements The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.

- b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits.
- B. Submit shop drawing for each drywall partition, furring and ceiling system showing size and gauges of framing members, hanger and anchorage devices, wallboard types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of drywall work to adjacent work.
- C. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.
- D. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition, furring and ceiling system specified herein, and for each fire-rated and sound-rated gypsum board assembly. Submit other data as required to show compliance with these specifications, including data for mold resistant joint compound.
- E. Test Reports: This Contractor shall submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.

#### 1.7 PRODUCT HANDLING AND PROTECTION

- A. Deliver, store and handle drywall work materials to prevent damage. Deliver materials in their original, unopened containers or bundles, and store where protected from moisture, damage and from exposure to the elements. Store wallboard in flat stacks.
- B. Protect wallboard from becoming wet.

#### 1.8 ENVIRONMENTAL CONDITIONS

- A. Provide and maintain minimum temperature of fifty-five (55) degrees F. and adequate ventilation to eliminate excessive moisture within the building in the area of the

drywall work for at least twenty-four (24) hours, prior to, during and after installation of drywall work. Installation shall not start until windows are glazed and doors are installed, unless openings are temporarily closed. Space above suspended ceilings shall be vented sufficiently to prevent temperature and pressure build up.

#### 1.9 JOB MOCK-UP

- A. At a suitable location, where directed by the Commissioner, lay up a portion of a finished wall and ceiling demonstrating the quality of work, including finishing, to be obtained under this Section. Omit drywall boards in locations as directed by the Commissioner to show stud spacing and attachments; after acceptance, complete assembly.
- B. Adjust the finishing techniques as required to achieve the finish required by the Commissioner as described in this Section of these specifications.
- C. Upon approval of the mock-up, the mock-up may be left in place as a portion of the finished work of this Section.
- D. All drywall work shall be equal in quality to approved mock-up.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers for Gypsum Drywall Panels and Accessories: Materials specified below, unless noted otherwise or specified herein, are those of U.S. Gypsum Co. Equivalent materials of Georgia Pacific, Lafarge North America, or National Gypsum Co. meeting specification requirements are acceptable.
- B. Acceptable Manufacturers for Metal Supports of Drywall Assemblies: Unless otherwise noted, provide products manufactured by Dietrich Metal Framing, Super Stud Building Products, Marino/Ware, Clark Western or approved equal.

#### 2.2 METAL SUPPORTS

- A. Metal Floor and Ceiling Runners
  - 1. Channel Type: Formed from 20 U.S. Std. gauge (unless otherwise noted) galvanized steel, width to suit channel type metal studs. Use 20 ga. top runners with 1-1/4" minimum flanges.
  - 2. Ceiling runners and head of wall connections at rated partitions shall conform to UL #2079 for cycle movement. Provide positive mechanical connection of framing to structure, allowing for vertical movement within connections. Minimum of 20 ga. galvanized steel for clips, 25 ga. galvanized steel for ceiling runners. Providing a friction free – anti-seizure movement capacity.
    - a. As manufactured by the Steel Network, VertiClip or VertiTrack or equal made by Metal-Lite Inc.

b. FireTrak (including stud clips) by FireTrak Corp. or equal made by Metal-Lite Inc.

3. "J" Type: Formed from 20 U.S. Std. gauge galvanized steel, 1" x 2-1/2" or 4" wide (to suit detail) x 2-1/4" (for shaft wall).

B. Metal Studs, Framing and Furring

1. Channel Type Studs: Channel type with holes for passage of conduit formed from minimum 20 U.S. Std. gauge (unless heavier gauge is required to meet deflection limits) galvanized steel, width as shown on drawings.

2. Furring Channels: Hat shaped, formed from galvanized steel, 25 U.S. Std. gauge.

3. "C-H," "CT," or "I" Type Stud: 1-1/2" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.

4. Double "E" Type Stud or "J" Track with Holding Tabs: 2" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.

5. Continuous 16 gauge x 8" wide steel wall plate screwed to studs as required for support of railings, toilet partitions and other items supported on drywall partitions and walls.

C. Suspended Ceiling and Fascia Supports

1. Main Runners: 1-1/2" steel channels, cold rolled at 0.475 lbs. per ft., rust-inhibitive paint finish.

2. Furring Members: Screw-type hat-shaped furring channels of 25 ga. zinc-coated steel; comply with ASTM C 645.

3. Hangers: Galvanized, 1" x 3/16" flat steel slats capable of supporting 5x calculated load supported.

4. Hanger Anchorages: Provide inserts, clips, bolts, screws and other devices applicable to the required method of structural anchorage for ceiling hangers. Size devices for 5x calculated load supported.

5. Furring Anchorages: 16 ga. galvanized wire ties, manufacturer's standard clips, bolts or screws as recommended by furring manufacturer.

D. All galvanized steel members shall have coating conforming to ASTM A 653, G60.

2.3 GYPSUM WALLBOARD TYPES

A. Gypsum Wall Board: 1/2" thick and 5/8" thick as indicated on drawings, "Sheetrock," 48" wide, in maximum lengths available to minimize end-to-end butt joints.

- B. Fire Rated Gypsum Wall Board: 1/2" thick and 5/8" thick as indicated on drawings, "Sheetrock Firecode C," or "Firecheck Type C" by Lafarge, 48" wide, in maximum lengths available to minimize end-to-end butt joints.
- C. Moisture/Mold Resistant Gypsum Wall Board (for areas in toilet rooms, not scheduled to receive ceramic tile and scheduled to received tile, or where fire rating is required): 1/2" thick and 5/8" thick as indicated on drawings, "Mold Tough," "Mold Tough FR," by U.S. Gypsum, "DensArmor Plus" by Georgia Pacific or Lafarge "Mold Defense" and/or Lafarge "Mold Defense Type X," 48" wide, in maximum lengths available to minimize end-to-end butt joints.
  - 1. Board must have a rating of 10 per ASTM D 3273 with a core that meets ASTM C 1396, Section 6 or ASTM C 1658.
- D. Mold Resistant Shaft Wall Liner: Solid gypsum board liner for shaft wall construction, 1" thick, 24" wide, as required to suit condition, by standard lengths as required, beveled edges. Provide "Mold Tough Liner Panel," "DensGlass Ultra Shaft Guard" by Georgia Pacific, or Lafarge "Mold Defense Shaftliner Type X" and/or Lafarge "Weather Defense Shaftliner Type X."
  - 1. Liner board must have a rating 10 per ASTM D 3273 with a core that meet ASTM C 1396 Section 6 and ASTM C 442.

#### 2.4 ACCESSORIES

- A. Acoustical Insulation: Paper-less, non-combustible, semi-rigid mineral fiber mat, 2" thick, in walls (unless otherwise indicated), 3 lb./cu. ft. maximum density; Thermafiber LLC "Thermafiber," or approved equal.
- B. Fasteners for Wall Board: USG Brand Screws; Type S Bugle Head for fastening wallboard to lighter gauge interior metal framing (up to 20 ga.). Type S-12 Bugle Head for fastening wallboard to heavier gauge interior metal framing (20 ga. to 12 ga.); Type S and Type S-12 Pan Head for attaching metal studs to door frames and runners; and Type G Bugle Head for fastening wallboard to wall board. Lengths specified below under "Part 3 - Execution" Articles and as recommended by drywall manufacturer.
- C. Laminating Adhesive: "Sheetrock Brand Joint Compound."
- D. Metal Trim - Corner Beads: For 90 degree External Corners - "Dur-A-Bead" No. 103, 27 U.S. Std. ga. galvanized steel, 1-1/4" x 1-1/4", for 90 degree external corners.
- E. Metal Trim - Edge Beads: "Sheetrock Brand Paper Faced Metal Bead and Trim."
- F. Metal Trim Treatment Materials and Joint Treatment Materials for Gypsum Drywall Boards: Paper tape for joint reinforcing; Setting Type (Durabond 90) or Lightweight Setting Type Joint Compound for taping and topping; and Ready Mix Compound for finishing.
  - 1. For mold-resistant drywall, water resistant drywall, and tile backer board, use glass mesh tape with setting joint compound that is rated 10 when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274.

Acceptable joint compound is "Rapid Set One Pass" made by CTS Cement Manufacturing Corp. or "Rapid Joint" manufactured by Lafarge North America or approved equal meeting standards noted herein.

- G. Control Joints: No. 0.093, USG.
- H. Acoustical Sealant: USG "Acoustical Sealant" or "Tremco Acoustical Caulking" of Tremco Mfg. Co., or approved equal.
- I. Neoprene Gaskets: Conform to ASTM D 1056.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where gypsum drywall is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Where feasible, one or both of the following procedures shall be used to minimize the exposure of gypsum wallboard to materials or finishes which have high short-term emissions of VOC's, formaldehyde, particulates, or other air-borne compounds:
  - 1. The gypsum wall board shall be taped, spackled and primed *before* the installation of the highly-emitting materials.
  - 2. The gypsum wallboard shall be installed *after* the installation of the highly-emitting materials.
- B. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paint, wood preservatives, and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.
- C. General
  - 1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.
  - 2. All metal framing for drywall partitions shall extend from floor to underside of structural deck above. Provide for vertical deflection with positive mechanical connections of framing members to structure.
  - 3. Provide concealed reinforcement, 16 ga. thick by eight (8) inches wide or as detailed or as recommended by manufacturer, for attachment of railings, toilet partitions, and other items to be supported on the partitions which cannot be

attached to the metal framing members. Concealed reinforcement shall span between metal studs and be attached thereto using two (2) self-tapping pan head screws at each stud.

- a. Back of drywall shall be scored or notched to prevent bulging out where reinforcement plate occurs.
- D. Fire-Rated Assemblies: Install fire-rated assemblies in accordance with requirements of authorities having jurisdiction, Underwriters' Laboratories and test results obtained and published by the drywall manufacturer, for the fire-rated drywall assembly types indicated on the drawings.
- E. Acoustic Assemblies: Install acoustic rated assemblies to achieve a minimum STC as noted on drawings, in accordance with test results obtained and published by the drywall manufacturer, for the drywall assembly type indicated on the drawings.
- F. Sealant
1. Install continuous acoustical sealant bead at top and bottom edges of wallboard where indicated or required for sound rating as wallboard is installed, and between metal trim edge beads and abutting construction.
  2. Install acoustical sealant in 1/8" wide vertical control joints within the length of the wall or partitions, and in all other joints, specified below under "Control Joints." Install bead of acoustical sealant around electric switch and outlet boxes, piping, ducts, and around any other penetration in the wallboard; place sealant bead between penetrations and edge of wallboard.
  3. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as wallboard surface. Sealant beads shall be 1/4" to 3/8" diameter.
- G. Wall Board Application
1. Do not install wallboard panels until steel door frames are in place; coordinate work with Section 081113, "Steel Doors and Frames."
  2. See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies. Use water-resistant wallboard where indicated on drawings and where wallboard would be subject to moisture. Install water-resistant wallboard in full, large sheets (no scraps) to limit number of butt joints.
  3. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.
  4. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.
  5. Provide "Thermafiber" safing insulation meeting standards of Section 078413 at flutes of metal deck where partitions carry up to bottom of metal deck.

6. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate wallboard; fill gaps with acoustic sealant.
  7. Where wallboard is to be applied to curved surfaces, dampen wallboard on back side as required to obtain required curve. Finish surface shall present smooth, even curve without fluting or other imperfections.
  8. Screw fasten wallboard with power-driven electric screw driver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.
  9. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.
- H. Metal Trim: Install and mechanically secure in accordance with manufacturer's instructions; and finish with three (3) coats of joint compound, feathered and finish sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions.
1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.
  2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of wallboard exposed to view, where edges abut dissimilar materials, where edges would be exposed to view, and elsewhere where shown on drawings. Where indicated on drawings, seal joint between metal edge bead and adjoining surface with specified gasket, 1/8" wide minimum and set back 1/8" from face of wallboard, unless other size and profile indicated on drawings.
  3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.
- I. Control Joint Locations: Gypsum board surfaces shall be isolated with control joints where:
1. Ceiling abuts a structural element, dissimilar wall or other vertical penetration.
  2. Construction changes within the plane of the partition or ceiling.
  3. Shown on approved shop drawings.
  4. Ceiling dimensions exceed thirty (30) feet in either direction.
  5. Wings of "L," "U," and "T" shaped ceiling areas are joined.
  6. Expansion or control joints occur in the structural elements of the building.
  7. Shaftwall runs exceed 30' without interruption.
  8. Partition or furring abuts a structural element or dissimilar wall or ceiling.
  9. Partition or furring runs exceed 30' without interruption.

10. Where control joints are required, ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners.

J. Joint Treatment and Spackling

1. Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.
2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in three (3) coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also required where wallboard will be covered by finish materials which require a smooth surface, such as vinyl wall coverings.

3.3 FURRED WALLS AND PARTITIONS

- A. Use specified metal furring channels. Run metal furring channel framing members vertically, space sixteen (16) inches o.c. maximum. Fasten furring channels to concrete or masonry surfaces with power-driven fasteners or concrete stub nails spaced sixteen (16) inches o.c. maximum through alternate wing flanges (staggered) of furring channel. Furring channels shall be shimmed as necessary to provide a plumb and level backing for wallboard. At inside of exterior walls, an asphalt felt protection strip shall be installed between each furring channel and the wall. Furring channel and splices shall be provided by nesting channels at least eight (8) inches and securely anchoring to concrete or masonry with two (2) fasteners in each wing.
- B. Wallboard Installation: Same as specified under Article 3.4 - "Metal Stud Partitions."

3.4 METAL STUD PARTITIONS

- A. Runner Installation: Use channel type. Align accurately at floor according to partition layout. Anchor runners securely sixteen (16) inches o.c. maximum with power-driven anchors to floor slab, with power-driven anchors to structural slab above. See "Stud Installation" below for runners over heads of metal door frames. Where required, carefully remove sprayed-on fireproofing to allow partition to be properly installed.
- B. Stud Installation
  1. Use channel type, positioned vertically in runners, spaced as noted on drawings, but not more than sixteen (16) inches o.c.
  2. Anchor studs to floor runners with screw fasteners. Provide snap-in or slotted hole slip joint bolt connections of studs to ceiling runners leaving space for movement. Anchor studs at partition intersections, partition corners and where partition abuts other construction to floor and ceiling runners with sheet metal screws through each stud flange and runner flange.

3. Connection at ceiling runner for non-rated partitions shall be snap-in or slotted hole slip joint bolt connection that shall allow for movement. Seal studs abutting other construction with 1/8" thick neoprene gasket continuously between stud and abutting construction.
  4. Connections for fire rated partitions at ceiling runners shall conform to UL Design #2079.
  5. Install metal stud horizontal bracing wherever vertical studs are cut or wallboard is cut for passage of pipes, ducts or other penetrations, and anchor horizontal bracing to vertical studs with sheet metal screws.
  6. At jambs of door frames and borrowed light frames, install doubled-up studs (not back to back) from floor to underside of structural deck, and securely anchor studs to jamb anchors of frames and to runners with screws. Provide cross braces from hollow metal frames to underside of slab.
  7. Over heads of door frames, install cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs, and securely anchor runner to adjacent vertical studs with sheet metal screws. Install cut-to-length vertical studs from runner (over heads of door frame) to ceiling runner sixteen (16) inches maximum o.c. and at vertical joints of wallboard, and securely anchor studs to runners with sheet metal screws.
  8. At control joints, in field of partition, install double-up studs (back to back) from floor to ceiling runner, with 1/4" thick continuous compressible gasket between studs. When necessary, splice studs with eight (8) inches minimum nested laps and attach flanges together with two (2) sheet metal screws in each flange. All screws shall be self-tapping sheet metal screws.
- C. Runners and Studs at Chase Wall: As specified above for "Runners" and "Studs" and as specified herein. Chase walls shall have either a single or double row of floor and ceiling runners with metal studs sixteen (16) inches o.c. maximum and positioned vertically in the runners so that the studs are opposite each other in pairs with the flanges pointing in the same direction. Anchor all studs to runner flanges with sheet metal screws through each stud flange and runner flange following requirements of paragraph 3.4, B. Provide cross bracing between the rows of studs by attaching runner channels or studs set full width of chase attached to vertical studs with one self-tapping screw at each end. Space cross bracing not over thirty-six (36) inches o.c. vertically.
- D. Wallboard Installation - Single Layer Application (Screw Attached)
1. Install wallboard with long dimension parallel to framing member and with abutting edge joints over web of framing member. Install wallboard with long dimension perpendicular to framing members above and below openings in drywall extending to second stud at each side of opening. Joints on opposite sides of wall shall be arranged so as to occur on different studs.
  2. Boards shall be fastened securely to metal studs with screws as specified. Where a free end occurs between studs, back blocking shall be required. Center abutting

ends over studs. Correct work as necessary so that faces of boards are flush, smooth, true.

3. Wallboard screws shall be applied with an electric screw gun. Screws shall be driven not less than 3/8" from ends or edges of board to provide uniform dimple not over 1/32" deep. Screws shall be spaced twelve (12) inches o.c. in the field of the board and 8" o.c. staggered along the abutting edges.
4. All ends and edges of wallboard shall occur over screwing members (studs or furring channels). Boards shall be brought into contact but shall not be forced into place. Where ends or edges abut, they shall be staggered. Joints on opposite sides of a partition shall be so arranged as to occur on different studs.
5. At locations where piping receptacles, conduit, switches, etc., penetrate drywall partitions, provide non-drying sealant and an approved sealant stop at cut board locations inside partition.

E. Wallboard Installation - Double-Layer Application

1. General: See drawings for wallboard partition types required.
2. First Layer (Screw Attached): Install as described above for single layer application.
3. Second Layer (Screw Attached): Screw attach second layer, unless laminating method of attachment indicated on drawings or necessary to obtain required sound rating or fire rating. Install wallboard vertically with vertical joints offset thirty-four (34) inches from first layer joints and staggered on opposite sides of wall. Attach wallboard with 1-5/8" screws sixteen (16) inches o.c. along vertical joints and sixteen (16) inches o.c. in the field of the wallboard. Screw through first layer into metal framing members.
4. Second Layer (Laminated): Install wallboard vertically. Stagger joints of second layer from first layer joints. Laminate second layer with specified laminating adhesive in beads or strips running continuously from floor to ceiling in accordance with manufacturer's instructions. After laminating, screw wallboard to framing members with 1-5/8" screws, spaced twelve (12) inches o.c. around perimeter of wallboard.

F. Wallboard Installation - Laminated Application: Where laminated wallboard is indicated, use specified laminating adhesive, install wallboard vertically and maintain tolerances as specified for screw attached wallboard.

G. Insulation Installation: Install where indicated on drawings. Place blanket tightly between studs.

H. Deflection of Structure Above: To allow for possible deflection of structure above partitions, provide top runners for non-rated partitions with 1-1/4" minimum flanges and do not screw studs or drywall to top runner. Where positive anchorage of studs to top runner is required, anchorage device shall be by means of slotted hole (in clip

connection with screw attachment to web of steel through bushings located in slots of clips), or other anchorage device approved by the Commissioner.

I. Control Joints

1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.
2. Back by double framing members.
3. Attach control joint to face layer with 9/16" galvanized staples six (6) inches o.c. at both flanges along entire length of joint.
4. Provide two (2) inch wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.

3.5 DRYWALL FASCIAS AND CEILINGS

- A. Furnish and install inserts, hanger clips and similar devices in coordination with other work.
- B. Secure hangers to inserts and clips. Clamp or bolt hangers to main runners.
- C. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
- D. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
- E. Metal Furring Channels: Space sixteen (16) inches o.c. maximum. Attach to 1-1/2" main runner channels with furring channel clips (on alternate sides of main runner channels). Furring channels shall not be let into or come in contact with abutting masonry walls. End splices shall be provided by nesting furring channels no less than eight (8) inches and securely wire tying. At any openings that interrupt the furring channels, install additional cross reinforcing to restore lateral stability.
- F. Mechanical accessories, hangers, splices, runner channels and other members used in suspension system shall be of metal, zinc coated, or coated with rust inhibitive paint, of suitable design and of adequate strength to support units securely without sagging, and such as to bring unit faces to finished indicated lines and levels.
  1. Provide special furring where ducts are over two (2) feet wide.
- G. Apply board with its long dimension at right angles to channels. Locate board butt joints over center of furring channels. Attach board with one (1) inch self-drilling drywall screws twelve (12) inches o.c. in field of board at each furring channel; eight (8) inches o.c. at butt joints located not less than 3/8" from edges.

### 3.6 SHAFT WALLS

- A. Runner Installation: Use "J" metal runners at floor and ceiling, with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and twenty-four (24) inches o.c.
- B. Shaft Wall Liner: Cut shaft wall liner panels one (1) inch less from floor to ceiling height and erect vertically between J-runners.
- C. C-H Studs: Cut metal studs 3/8" to not more than 1/2" less than floor to ceiling height and install between shaft wall liner panels so that panels are fitted snugly into the one (1) inch wide "H", "T" or "I" portion of the stud. Space studs twenty-four (24) inches o.c., unless otherwise indicated on drawings. Install full-length steel E-Studs or J-runners vertically at T-intersections, corners, door jambs, and columns. Install full length E-Studs or J-runners over shaft wall liner both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-runner at edges, horizontal runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall. Install floor-to-ceiling steel E-Studs or J-runners each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two (2) 3/8" Type S screws, space twelve (12) inches o.c. Over metal doors, install a cut to length section of runner and attach to strut-studs with clip angles and 3/8" Type S Screws space twelve (12) inches o.c.
- D. Wallboard Installation - Double Layer Installation: Erect gypsum wallboard base layer horizontally one side of studs with end joints staggered. Fasten base layer panels to studs with one (1) inch Type S screws twenty-four (24) inches o.c. Caulk perimeter of base layer panels. Apply gypsum wallboard face layer vertically over base layer with joints staggered and attached with 1-5/8" Type S screws staggered from those in base, spaced eight (8) inches o.c. and driven into studs.
- E. Wallboard Installation (Where Both Sides of Shaft Wall are Finished): Apply gypsum wallboard face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with one (1) inch or two (2) inches Type S screws spaced eight (8) inches o.c. in field and along edges into studs.
- F. Cants: Provide one (1) inch thick shaft wall liner, cut to suit condition, at beams and other projections wider than two (2) inches in elevator shafts. Cants shall slope seventy-five (75) degrees from the horizontal. Screw attach shaft wall liner to the vertical metal studs.
- G. Support elevator hoistway door frames independently of drywall shaft framing system, or reinforce system in accordance with system manufacturer's instructions.
- H. Where handrails are indicated for direct attachment to drywall shaft system, provide not less than a sixteen (16) ga. x eight (8) inches wide galvanized steel reinforcement strip, accurately positioned and secured to studs and concealed behind not less than one 1/2" thick course of gypsum board in the system.

- I. Integrate stair hanger rods with drywall shaft system by locating cavity of system as required to enclose rods.

### 3.7 ERECTION AT COLUMN ENCLOSURES

- A. Metal furring supports shall be provided under work of this Section, and shall be cut to lengths as necessary for tight fit such that spacing is not more than sixteen (16) inches o.c.
- B. Board shall be fastened securely to supports with screws as specified. Place boards in position with minimum amount of joints. Where free ends occur between supports, back-blocking or furring shall be required. Center abutting ends over supports. Correct work as necessary so that faces of boards are flush, smooth and true. Provide clips or cross furring for attachment as required.
- C. All layers shall be screw attached to furring.
- D. When column finish called for on drawings to be in the same plane as drywall finish layer, maintain even, level plane.

### 3.8 FINISHING

- A. Taping: A thin, uniform layer of compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately, but shall not function as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.
- B. Filling: After initial coat of compound has hardened, additional compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least four (4) inches on either side of the tape. No fill coat is necessary on interior angles.
- C. After compound has hardened, a finishing coat of compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound, and provide a true angle. Where necessary, sanding shall be done between coats and following the final application of compound to provide a smooth surface, ready for painting.
- D. Fastener Depressions: Compound shall be applied to all fastener depressions followed, when hardened by at least two (2) coats of compound, leaving all depressions level with the plane of the surface.
- E. Finishing Beads and Trim: Compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by two (2) coats of compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.

- F. Level of finish for surface exposed to view shall conform to Level 5 "skim coat" of ASTM C 840 and GA-214 of the Gypsum Association.
- G. Drywall construction with defects of such character which will mar appearance of finished work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the City of New York.

### 3.9 CLEANING AND ADJUSTMENT

- A. At the completion of installation of the work, all rubbish shall be removed from the building leaving floors broom clean. Excess material, scaffolding, tools and other equipment shall be removed from the building.
- B. Work shall be left in clean condition ready for painting or wall covering. All work shall be as approved by the Commissioner.
- C. Cutting and Repairing: Include all cutting, fitting and repairing of the work included herein in connection with all mechanical trades and all other trades which come in conjunction with any part of the work, and leave all work complete and perfect after all trades have completed their work.

### 3.10 PROTECTION OF WORK

- A. Installer shall advise Contractor of required procedures for protecting drywall work from damage and deterioration during remainder of construction period.

### 3.11 WASTE MANAGEMENT

- A. Identify manufacturer's policy for collection or return of construction scrap, unused material, demolition scrap, and/or packaging material. Where feasible, institute demolition and construction waste separation and recycling to take advantage of manufacturer's programs.

END OF SECTION

## SECTION 093013

### CERAMIC TILING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ceramic tiling work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Ceramic mosaic floor tile.
  - 2. Ceramic wall tile and matching base.
  - 3. Setting beds, grout, sealant and waterproofing membrane.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Gypsum board assemblies - Section 092116, for tile backing board.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. Qualifications of Installers: For cutting, installing and grouting of ceramic tile, use only thoroughly trained and experienced journeyman tile setters who are completely familiar with the requirements of this work, and the recommendations contained in the referenced standards.
- C. Adhesives: "Green Seal Environmental Standard for Certification of Commercial Adhesives" (GS-36), Green Seal, Inc., Washington, DC, <http://www.greenseal.org>
- D. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the following:
  - 1. Manufacture all ceramic tile in accordance with Standard Grade Requirements of ANSI A-137.1.
  - 2. Install all ceramic tile in accordance with the recommendations contained in Handbook for Ceramic Tile Installation of the Tile Council of America, Inc., latest edition.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  - 2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  - 5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Samples
  - 1. Before any ceramic tile is delivered to the job site, submit to the Commissioner sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of ceramic tile and grout specified.

2. Submit 12" x 12" samples of waterproofing membrane.
- C. Master Grade Certificates: Prior to opening ceramic tile containers, submit to the Commissioner a Master Grade Certificate, signed by an officer of the firm manufacturing the ceramic tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the project.
  - D. Manufacturer's certification of recycled content per section 2.1 of this specification.
  - E. Manufacturer's certification of lead-free glazings (for glazed tiles) per section 2.1 of this specification.
  - F. Manufacturer's certification of product compliance with adhesive standards per section 2.1 of this specification (for mastic-set applications).
  - G. Manufacturer's certification of product compliance with VOC limits for mortars and grouts per section 2.1 of this specification.
  - H. Material Safety Data Sheets.
  - I. Manufacturer's maintenance and cleaning instructions.
  - J. Manufacturer's policy statement on ceramic tile recycling programs.
  - K. Mock-Ups
    1. At an area on the site where approved by the Commissioner, provide a mock-up ceramic tile installation.
      - a. Make the mock-up approximately 36" x 36" in dimension.
      - b. Provide one mock-up for each type, class, and color of installation required under this Section.
      - c. The mock-ups may be used as part of the Work, and may be included in the finished Work when so approved by the Commissioner.
      - d. Revise as necessary to secure the Commissioner's approval.
    2. The mock-ups, when approved by the Commissioner, will be used as datum for comparison with the remainder of the work of this Section for the purposes of acceptance or rejection.
    3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

#### 1.6 PRODUCT HANDLING

##### A. Delivery and Storage

1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.

2. Store all materials under cover in a manner to prevent damage and contamination; store only the specified materials at the job site.
- B. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

#### 1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at not less than 50 deg. F. in tiled areas during installation and for 7 days after completion.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS OF TILE

- A. Provide tile manufactured by American Olean, Crossville, Inc., Daltile or approved equal meeting these specifications. The Commissioner reserves the right to pick tile from any price group.

#### 2.2 WALL TILE AND BASE

- A. Provide new unglazed ceramic mosaic tile, 2x2, American Olean, OA22 storm gray, or approved equal.
- B. Provide cove base as indicated on drawings.

#### 2.3 FLOOR TILE

- A. Provide new unglazed ceramic mosaic tile, 2x2, American Olean, OA22 storm gray, or approved equal.
- B. Floor tile shall have water absorption not to exceed 0.5%.
- C. Provide non-slip tile where scheduled, of same characteristics as ceramic mosaics specified herein with the addition of 7-1/2% abrasive grain by weight.

#### 2.4 TRIM AND SPECIAL SHAPES

- A. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.

## 2.5 SETTING BEDS AND GROUT

- A. Portland Cement: ASTM C 150, Type 1.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Sand: ASTM C 144, clean and graded natural sand.
- D. Reinforcing for Mud Set Systems: 2" x 2" x 16/16 ga. welded wire mesh.
- E. Latex Admixture for Mortar Bed
  - 1. MAPEI, Planicrete AC, blended with a 3:1 site mix.
  - 2. Laticrete 333.
  - 3. ProSpec – Acrylic Additive.
  - 4. Custom Building Products – Flex Thin Set Additive.
- F. Latex – Portland Cement Bond Coat, complying with ANSI A118.4 and ISO 13007, C2ES2P2.
  - 1. MAPEI, Keralastic System thin set mortar, consisting of Kerabond dry-set mortar and Keralastic latex admixture.
  - 2. Laticrete; 211 dry-set mortar and 4237 latex admixture.
  - 3. ProSpec – Permalastic System consisting of Permalastic Dryset Mortar and Permalastic Admixture
  - 4. Custom Building Products – Mega Flex Crack Prevention Mortar.
- G. Wall and Base Tile
  - 1. Over cement board use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, Custom Building Products Mega Flex or equal by Laticrete or ProSpec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-244; coat back of board with waterproof membrane as specified below.
  - 2. Over glass mat water resistant gypsum backer board use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-245.
- H. Floor Tile Thin Set with Waterproof Setting Bed: Set floor tile and stone saddle using thin set latex Portland cement bond coat, Basis of Design, MAPEI, Kerabond/Keralastic System, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and waterproofing membrane conforming to TCA Detail F-122. Use this system where toilet room occurs over occupied space other than another toilet room and wherever else noted on drawings.

- I. Floor Tile - Mud Set: Set floor tile using Portland Cement mortar setting bed conforming to ANSI A108.1A and latex modified Portland cement bond coat, Basis of Design, MAPEI, Kerabond/Keralastic System, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail F-112.
- J. Waterproofing Membrane complying with ANSI A118.10 and ANSI A118.12; and having IAPMO certification as a shower pan liner: "Mapelastic AquaDefense" by MAPEI with factory blended "Bio-Block Antimicrobial"; "Laticrete 9235 with Microban" made by Laticrete International, ProSpec B6000 or Custom Building Products 9240.
  - 1. Reinforce membrane with polyester fabric.
- K. Water: Clean, fresh and suitable for drinking.
- L. Grout complying with A118.7; and ISO 13007, CG2WAF: For grouting ceramic tile, provide a commercial Portland cement grout "Ultracolor Plus" (additive not required) made by MAPEI or Laticrete Sanded Grout with required Latex Additive or Custom Building Products Prism Sure Color Grout. Add latex additive to grout made by same manufacturer as grout.
  - 1. Basis of Design, Color: Laticrete 78, sterling silver.
- M. Physical Properties: The setting beds and grouts must meet the following physical requirements:
  - 1. Compressive Strength: 3000 psi min.
  - 2. Shear Bond Strength: 500 psi min.
  - 3. Water Absorption: 4.0% max.
  - 4. Service Rating (ASTM C 627): Extra Heavy Duty.
- N. Sealer: Seal all grout joints and all unglazed tile using No. 004 "Keraseal Penetrating Sealer for Unglazed Grout and Tile" as manufactured by Mapei Corp., "Sealer's Choice 15 Gold" by Aqua Mix Inc., or approved equal.
- O. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil, with a melting point of 120 to 140 deg. F. per ASTM D 87.
  - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

- P. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

## 2.6 SEALANT

- A. Joint Backing: Preformed, compressible, resilient, non-extruding, non-staining strips of foam neoprene, foam polyethylene, or other material recommended by sealant manufacturer.
- B. Bond Breaker: Polyethylene tape, 3 mils thick, or other material recommended by sealant manufacturer.
- C. Sealant Primer: Colorless, non-staining, or type to suit substrate surface, as recommended by sealant manufacturer.
- D. Sealant: One-part silicone based sanitary sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25. Sealant hardness upon full cure shall be between 20-30 Shore "A" Durometer. Color of sealant to blend with or match adjacent materials, and as selected by the Commissioner. Sealant shall be equivalent to "1700 Sanitary Sealant" made by General Electric or equal by Pecora, Tremco or approved equal.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where ceramic tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels in Floors: + 1/8" in 10'-0" distance and 1/4" total max. variation from levels shown.
- B. Grind or fill concrete and masonry substrates as required to comply with allowable variations.

### 3.3 PREPARATION

- A. Steel trowel and fine broom finish concrete slabs that are to receive ceramic tile. Cure concrete slabs that are to receive tile before tile application. Do not use liquid curing compounds or other coatings that may prevent bonding of tile setting materials to slabs. Slab shall be dry at time of tile installation.
- B. Etch concrete substrate as may be required to remove curing compounds or other substances that would interfere with proper bond of setting bed. Rinse with water to remove all traces of treatment. Surface must meet finish requirements as noted in ANSI 108.01.

- C. Seal substrate with sealer as recommended by manufacturer of mortar or adhesive.

### 3.4 JOINTS IN TILE WORK

- A. Joint Widths: 1/16" wide in ceramic tile.
- B. Alignment: Wall, base and floor joints shall align through the field and trim. Direction and location of all joints as directed by Commissioner.
- C. Movement Joints: Conform to TCA Detail EJ171. Locate where movement joints are in back-up material. Provide movement joint at joints between mop receptors and ceramic tile. Provide movement joint at all vertical internal joints of wall tile. Movement joints 1/8" wide in ceramic tile. Fill all movement joints with specified backing and sealant. Use bond breaker where sufficient space for joint backing does not exist.
  - 1. Provide sealant between ceramic tile and plumbing fixtures, mirrors, pipes, countertops and other dissimilar materials penetrating or adjacent to ceramic tile.

### 3.5 INSTALLATION

- A. Comply with the following installation standards
  - 1. Wall tile over cement board or glass mat backer board using dry set mortar with latex additive - ANSI A118.4 and ISO 13007, C2ES2P2.
  - 2. Floor tile over waterproofing membrane.- ANSI A118.4 and ISO 13007, C2ES2P2.
  - 3. Floor tile using full mud set mortar - ANSI A118.4 and ISO 13007, C2ES2P2.
- B. All setting beds and/or adhesives shall provide for an average contact area of not less than 95% coverage.
- C. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.
  - 1. Floors: 1/8" in 10'-0" run, any direction; +/- 1/8" at any location; 1/32" offset at any location.
  - 2. Walls: 1/8" in 8'-0" run, any direction; 1/8" at any location; offset at any location, 1/32".
  - 3. Joints: +/- 1/32" joint width variation of any location; 1/16" in 3'-0" run deviation from plumb and true.
- D. Waterproofing Membrane
  - 1. Install the membrane in strict accordance with manufacturer's written recommendations.

2. Upon completion of work, test horizontal membrane for leaks by plugging the drain or damming areas and filling with water. Inspect for leakage. Make necessary adjustments to stop all leakage and retest until watertight. If membrane is not covered by another surface immediately, provide protection until membrane is covered.
- E. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.
- F. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.
- G. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars, or covers overlap tile.
- H. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

### 3.6 CLEANING AND PROTECTION

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  1. Remove grout residue from tile as soon as possible.
  2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use cleaners only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning to insure removal of all cleaning material.
  3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Apply coat of sealer to all grout joints and all unglazed tile.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings from tile surfaces.
- E. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.

3.7 WASTE MANAGEMENT

- A. Identify manufacturer's policy for collection or return of construction scrap, unused material, demolition scrap, and/or packaging material. Where feasible, institute demolition and construction waste separation and recycling to take advantage of manufacturer's programs.

END OF SECTION

## SECTION 096400

### WOOD STRIP FLOORING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the wood strip flooring, as shown on the drawings and/or specified herein, including but not limited to, the following:
  - 1. Wood strip flooring and base.
  - 2. Plywood subflooring.
  - 3. Accessories.
  - 4. Field finishing of wood flooring.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Concrete slab - existing.
- F. Carpentry - Section 062000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

B. Special Experience Requirements

1. Installer: The contractor or subcontractor performing the work of this Section must, within the last five (5) consecutive years prior to the bid opening, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work.

C. General Standard: Comply with recommendations of National Wood Flooring Association (NWFA) Installation Guidelines.

- D. Source Quality Control: Obtain flooring of each type from single manufacturer or source, to ensure match of quality, color, pattern and texture.

1.5 LEED PERFORMANCE REQUIREMENTS

A. The following criteria are REQUIRED for the products included in this section:

1. Engineered wood, not including salvaged wood, shall contain a minimum of 10% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
2. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the Submittal Requirements of this Section.
3. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.
4. Wood Materials harvested and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements of this Section.
5. Permanently Installed wood-based materials used in this project that have been certified in accordance with the Forest Stewardship Council (FSC) guidelines shall be documented in accordance with the Submittal Requirements of this Section.
  - a. Applicable products include, but are not limited to, structural framing and general dimensional framing, flooring, finishes, built-in furnishings, miscellaneous blocking, fire rated plywood back panels used for equipment mounting, architectural panels, and plywood.
  - b. Certified wood material suppliers may be researched through the following websites: [www.rainforest-alliance.org/greenbuilding](http://www.rainforest-alliance.org/greenbuilding), [www.smartwood.org](http://www.smartwood.org), <http://www.certifiedwoodsearch.org/searchproducts.aspx>, [http://www.fscus.org/certified\\_companies/](http://www.fscus.org/certified_companies/).
  - c. Wood products previously purchased and used on prior projects, which are reused on this Project, are exempt from the FSC certification.

6. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419, Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints, and Coatings,(LEED BUILDING) where applicable.
7. Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior shall meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.
  - a. Clear Wood Finishes
 

1).	Varnish	350
2).	Sanding Sealers	350
3).	Lacquer	550
  - b. Shellac
 

1).	Clear	730
2).	Pigmented	550
  - c. Stains 250
  - d. Floor Coatings 100
  - e. Waterproofing Sealers 250
  - f. Sanding Sealers 275
  - g. Other Sealers 200
8. The calculation of VOC shall exclude water and tinting color added at the point of sale.
9. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.

#### 1.6 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the wood product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. Location in which wood materials were manufactured or fabricated and location from which wood was harvested.
    - c. For wood products, indication (Y/N) of whether the supplied product(s) are certified by the Forest Stewardship Council (FSC).
    - d. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment. Include total cost for all wood products and itemized costs for all FSC-certified wood products.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. Documentation that all composite wood and agrifiber products do not contain added urea-formaldehyde resins.
  6. Chain of custody certificate to document FSC-certification, if applicable.
- B. Product Data: Submit manufacturer's detailed technical product data and installation instructions for each type of wood flooring. Include instructions for handling, storage, installation, finishing, protection and maintenance.
- C. Samples: Submit sets of range samples for wood flooring; include finish.
1. Include six (6) inch samples of base.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Moisture Content: At time of delivery, limit average moisture content of wood flooring to 6%, with 8% maximum for any piece.
- B. Protect wood flooring from excessive moisture in shipment, storage and handling. Deliver in unopened cartons or bundles and store in a dry place, with adequate air circulation. Do not deliver material to building until "wet work" such as concrete and plaster have been completed and cured to a condition of equilibrium.

#### 1.8 PROJECT CONDITIONS

- A. Conditioning: Do not proceed with installation of wood flooring until spaces have been enclosed. Building must be dry with all wet work (i.e. concrete, plaster, drywall, fireproofing) completed. Further, the building HVAC system must be operating and the space shall have been at the expected ambient temperature and relative humidity for five days. Condition wood for five (5) days prior to start of installation by placing in spaces to receive flooring and maintaining ambient conditions in which it will be used before, during and after installation. Open packages of wood flooring which are sealed to permit natural adjustment of moisture content.

## 1.9 SPECIAL PROJECT WARRANTY

- A. Submit three (3) year warranty signed by Manufacturer and Contractor agreeing to repair or replace wood flooring which shrinks, warps, cracks, or otherwise deteriorates excessively, or which breaks its anchorage or bond with substrate or otherwise fails to perform as required, due to failures of materials and/or workmanship and not due to unusual exposure to moisture or other abusive forces or elements not anticipated for application.

## PART 2 PRODUCTS

### 2.1 WOOD MATERIALS

- A. Wood strip flooring shall be Quarter Sawn, Select, White Oak (per NOFMA grading rules), 3/4" thick and 4" face width. Flooring strips shall be tongued-and-grooved and end-matched; back face of each strip shall be back channeled. Strips shall be standard random lengths, complying with grading rules. Wood shall be kiln-dried and moisture content of wood at time of installation shall not exceed 8%.
- B. Plywood Subflooring: 3/4" thick C-D EXT APA Rating Sheathing, Exposure 1. Cover top of plywood with 30 lb. asphalt felt prior to application of wood flooring.
- C. Wood Trim: Where indicated to match wood flooring, provide wood base board molding, base shoe molding and stair risers of same species and grade as wood flooring. Provide wood stripping, nosings, saddles and thresholds, as indicated in or adjacent to wood flooring, of same species, grade and cut as wood flooring.

### 2.2 WOOD FIELD FINISHING

- A. Urethane Floor Varnish: Provide heavy duty, matte, water-based urethane floor finish equal to "Street Shoe" as manufactured by Basic Coatings, Inc., or equal made by Hillyard Chemical Co., Bona Kemi, or MinWax.

### 2.3 ACCESSORIES

- A. Fasteners: Provide screw type flooring nails as recommended by NWFA in "Installation Guidelines Manual."
- B. Cork Expansion Strip: Composition cork expansion strip.
- C. Vapor Barrier: Eight (8) mils polyethylene.
- D. Mastic: Cut black asphalt type.
- E. Perimeter Isolation: 3/8" thick fiberglass board, 6 - 15 pcf.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where wood strip flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 PREPARATION

- A. Wherever direct application of wood flooring to concrete substrate is indicated, test for dryness before proceeding with installation. If tests show dampness or moisture content in excess of 10%, do not proceed until slab is dry. Wood flooring manufacturer must approved substrate in writing, to the Commissioner prior to start of work of this Section.
- B. Grind high spots and fill low spots on concrete substrates to produce a maximum 1/8-inch deviation in any direction when checked with a 10-foot straight edge. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances on substrates that are incompatible with installation adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.3 INSTALLATION (GENERAL)

- A. General: Comply with flooring manufacturer's instructions and recommendations, but not less than recommended by NWFA "Installation Guidelines".
- B. Pattern: Comply with pattern or direction of pattern for laying wood flooring, as directed by Commissioner.
- C. Expansion Space: Provide expansion space at walls and other obstructions and terminations of flooring, not less than 1/2". Fill expansion space with flush cork expansion strip. Nail shoe molding or other trim to baseboard, rather than to flooring.
- D. Wood strip flooring shall be securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16" out of plane.

### 3.4 INSTALLATION OF WOOD FLOORING OVER OSB ON CONCRETE

- A. Cover concrete slab with 8-mil polyethylene vapor barrier set dry on concrete; lap ends and edges 6".

- B. Set 4'-0" x 8'-0" sheets of OSB sub-floor over vapor barrier as follows:
  - 1. Stagger panel joints allowing approximately 1/8" expansion space around all panels to prevent edge peaking due to compression caused by panel swell.
  - 2. Allow 3/4" minimum expansion space at all vertical obstructions.
  - 3. Panels shall be mechanically fastened using NWFA approved fasteners.
  - 4. Fasten 2" from the edge every 6" to 8" along the perimeter of the sheet and one fastener or more spaced every 12" in the interior of the panel. Fasten the center first to prevent the sub-floor from bowing.
- C. Cover plywood with 30 lb. asphalt felt lapping ends and edges 4".
- D. Nail finish wood flooring to plywood substrate, spacing nails 6" o.c. with one nail within 2" of each end of each strip.

### 3.5 SANDING AND FINISHING

- A. Machine sand installed unfinished flooring to remove offsets and non-level conditions, ridges, cups, and sanding machine marks which would be visually noticeable after finishing. Use three (3) grades of sandpaper, ending with 00 grade. Vacuum clean and immediately apply finish. Do not permit traffic on floor after sanding and until finish is completed. Cover sanded floor with building paper to provide access for application of first finish coats.
- B. Immediately after proper sanding, tack rag with clean-up solvent. Apply a thin coat of varnish. Allow to dry thoroughly. Burnish with #2 steel wool under a single brush floor machine. Tack rag with clean-up solvent. Apply a second and third coats of varnish in same manner.

### 3.6 PROTECTION

- A. Protect completed wood flooring during remainder of construction period with heavy Kraft paper or other suitable covering, so that flooring and finish will be without damage or deterioration at time of acceptance.

END OF SECTION

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## SECTION 096519

### RESILIENT TILE FLOORING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the resilient tile flooring, as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Rubber floor tile.
  - 2. Rubber studded floor tiles for elevator.
  - 3. Adhesive.
  - 4. Accessories.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Concrete slab - Section 033000.
- F. Gypsum board partitions- Section 092900.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
1. The rubber flooring products shall contain recycled content as available. Products with recycled content (the percentage of recycled content is based on the weight of the component materials) shall be documented in accordance with the Submittal Requirements below.
  2. Products extracted and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED BUILDING Submittal Requirements of this Section.
  3. Adhesives or sealants used for interior work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Products extracted and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED BUILDING Submittal Requirements of this Section
  5. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.

4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits)
- B. Manufacturer's Data: For information only, submit manufacturer's technical information and installation instructions for type of resilient tile flooring required.
  - C. Samples: Submit samples of each color of resilient tile flooring required. Provide twelve (12) inch square samples to illustrate the range of color and pattern variation. Sample submittals will be reviewed for color, texture and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
  - D. Maintenance Instructions: Submit two (2) copies of manufacturer's written instructions for recommended maintenance practices for each type of resilient tile flooring.

#### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

#### 1.7 ENVIRONMENTALLY-PREFERABLE PRODUCT CRITERIA:

- A. Adhesives (VOC content and prohibited compounds):
  1. Adhesives for resilient tile or sheet products shall comply with VOC content and prohibited compound requirements as stated in the Environmentally-Preferable Product Specifications, Section 01015 (Volatile Organic Compound (VOC) Limits For Adhesives), of the New York City Department of Design and Construction *Design Guide for Consultants*.
- B. Emissions Testing:
  1. To the extent feasible, resilient tile products shall comply with the Hard Surface Flooring emission criteria defined in the GREENGUARD™ directory of low emitting interior products and building materials, by Air Quality Sciences, Inc., Atlanta, GA.

## PART 2 PRODUCTS

### 2.1 RUBBER FLOOR TILE

- A. Provide "Brasilia", 24" x 24" x 1/8" thick 100% vulcanized rubber tile as manufactured by Allstate Rubber Co., color A33 solid medium grey, or equal by Johnsonite, Roppe, or approved equal.
- B. Provide 100% vulcanized rubber tile conforming to the following:
  - 1. Shore Hardness ASTM D 22 40 = 90.
  - 2. Water Resistance; DIN 430mm<sup>3</sup> 50 Cycles CSTB 0.71cm<sup>3</sup>.
  - 3. Resilience 27%.
  - 4. Elongation: 200%.
  - 5. Module Resistance 60% 100 kg/cm<sup>2</sup> +/- 10.
  - 6. Electrical Sensitivity 50,000 volts.
  - 7. Load Limit: 560 psi.
  - 8. Sound Absorption (as per DIN 52210): 2.5mm (1/8) gauge = 7db (A).
  - 9. ASTM E662/NFPA 258 Smoke Density: Passes + 189.
  - 10. ASTM E648 Critical Radiant Flux: Passes = 1.07 watts/cm<sup>3</sup>.
  - 11. ASTM D 2047-93 Static Coefficient of Friction = .87.
  - 12. Meets ASTM F-1344 Class 1.
- C. Rubber Studded Floor Tile: Provide black rubber tiles with stainless steel studs as manufactured by Aronson or approved equal.

### 2.2 ACCESSORIES

- A. Adhesives: Waterproof, stabilized type, as recommended by the tile manufacturer for the type of service indicated.
- B. Concrete Slab Primer: Non-staining type recommended by the tile manufacturer.
- C. Leveling Compound: Latex/Portland cement flash patching and leveling compound equal to No. DSP-520 made by H.B. Fuller or No. 226 with 3701 admixture made by Laticrete or equal made by Mapei, or approved equal.
- D. Edging Strips: 1/8" thick, homogeneous rubber composition, tapered or bullnose edge, color as selected by the Commissioner from manufacturer's standards.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where resilient tile flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels (Floors):  $\pm 1/8"$  in 10'-0" distance and 1/4" total maximum variation from levels shown.
- B. Grind or fill concrete substrates as required to comply with allowable variation.

### 3.3 PREPARATION

- A. Prepare concrete slabs to receive resilient tile flooring in accordance with ASTM F 710 "Standard Practice For Preparing Concrete Floors to Receive Flooring."
- B. Concrete Primer: Apply concrete slab primer if recommended by tile manufacturer, prior to application of the adhesive. Apply in compliance with manufacturer's directions.

### 3.4 ALLOWABLE TOLERANCES

- A. Allowable Tolerances in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.
  - 1. Floors: 1/8" in 10'-0" run, any direction; 1/32" offset at any location.

### 3.5 INSTALLATION

- A. Install tile only after all finishing operations, including painting, have been completed and permanent heating system is operating. Moisture content of concrete slabs, building air temperature and relative humidity must be within limits recommended by tile manufacturer.
- B. Place tile units with adhesive cement in strict compliance with the manufacturer's recommendations. Butt tile units tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions and to produce neat joints, laid tight, even and in straight, parallel lines. Extend tile units into toe spaces, door reveals, and into closet and similar openings.
- C. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on the finish tile as marked in the subfloor. Use chalk or other non-permanent marking devices.
- D. Lay tile from center marks established with principal walls, discounting minor off-sets, so that tile at opposite edges of the room are of equal width. Adjust as necessary to

avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.

- E. Match tiles for color and pattern by using tile from cartons in the same sequence as manufactured and packaged. Cut tile neatly to and around all fixtures. Broken, cracked, chipped or deformed tile is not acceptable.
- F. Tightly cement tile to sub-base without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks through tile, or other surface imperfections.
- G. Lay tile with grain in all tile running in the same direction.
- H. Place resilient edge strips tightly butted to tile and secure with adhesive. Provide edging strips at all unprotected edges of tile, unless otherwise shown.

### 3.6 CLEANING AND PROTECTION

- A. Remove any excess adhesive or other surface blemishes from tile, using neutral type cleaners as recommended by the tile manufacturer. Protect installed flooring from damage by use of heavy Kraft paper or other covering.
- B. Finishing: After completion of the project and just prior to the final inspection of the work, thoroughly clean tile floors and accessories.

END OF SECTION

## SECTION 096813

### CARPET TILE

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor materials, equipment, and services necessary to complete the carpet tile as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Carpet tile.
2. Adhesive.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  1. Carpet tiles shall have face fibers and/or backings that contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section

2. Carpet Tile installed in the building interior shall meet the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program.
  3. Carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.
  4. The VOC Content of all Carpet adhesives shall not exceed 50 g/l.
  5. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING)", where applicable. Certification of these products shall be in accordance with the Submittal Requirements of this Section.
  6. Products extracted and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED BUILDING Submittal Requirements of this Section.
  7. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Installer Qualifications: Firm with not less than three (3) years of experience in installation of commercial carpeting of type, quantity and installation methods similar to work of this Section.
- D. General Terminology/ Information Standard: Refer to current edition of "Carpet Specifier's Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.
- E. Carpet used on Project must be from same dye lot for each carpet type.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the LEED BUILDING certification items per Section 013520 – Sustainable Design.
- B. Product Data: Submit manufacturer's complete technical product data for each type of carpet, cushion and accessory item required.
- C. Samples: Submit full size samples of carpet tile and six (6) inches long samples of each type exposed edge stripping.
- D. Certification: Submit manufacturer's certification stating that carpet materials furnished comply with specified requirements.
1. Include listing of mill register numbers for carpet furnished.
  2. Include supporting certified laboratory test data indicating that carpet meets or exceeds specified test requirements.

- E. Maintenance Data: Submit manufacturer's printed maintenance recommendations, including methods and frequency recommended for maintaining carpet in optimum conditions under anticipated traffic and use conditions.

#### 1.6 EXTRA STOCK

- A. Produce and deliver to project at least five (5) percent overrun on calculated yardage. Provide required overrun exclusive of carpet needed for proper installation, waste and usable scraps.

#### 1.7 PRODUCT DELIVERY AND STORAGE

- A. Deliver carpeting materials in original mill protective wrapping with mill register numbers and tags attached. Store inside, in well ventilated area, protected from weather, moisture and soiling.

#### 1.8 WARRANTY

- A. Provide special project warranty, signed by Contractor and Manufacturer (Carpet Mill), agreeing to repair or replace defective materials and workmanship of carpeting work during one (1) year warranty period following substantial completion. Attach copies of product warranty.

### PART 2 PRODUCTS

#### 2.1 CARPET TILE

- A. Provide 18" x 18" 10 oz./sq. yd. carpet tile by Interface Grey 609008 or equal by Flor or Millken or approved equal.
- B. Layout pattern shall be as indicated on finish floor plan on drawings.

#### 2.2 ACCESSORIES

- A. Adhesive for Carpet Tile: Provide release type adhesive as recommended by the carpet tile manufacturer for use with carpet tile specified. Provide adhesive which complies with flame spread rating required for the carpet installation.
- B. Miscellaneous Materials: Provide the types of adhesives and tape, and other accessory items recommended by the carpet manufacturer and Installer for the conditions of installation and use.
- C. Leveling Compound: Latex/Portland cement flash patching and leveling compound equal to No. DSP-504 made by Specialty Construction Brands Inc, or No. 226 with 3701 admixture made by Laticrete or equal made by Mapei, or approved equal.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where carpet tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not

proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 PRE-INSTALLATION REQUIREMENTS

- A. Floor shall be clean and free of cracks and protrusions. Any gaps or cracks more than 1/16" wide to be filled in with latex leveling compound. Protrusions must be sanded down smooth, the floor cleanly swept and vacuumed if necessary to remove all dust and grit.
- B. Floor temperature shall be 65 deg., at least 24 hours prior to installation; and 48 hours after carpet is installed.
- C. Conduct a moisture test. The presence of moisture in the concrete floor will interfere with the curing and subsequent performance of the adhesive. Conduct the test as follows:
  - 1. Drive a concrete nail a half inch into the floor. Then remove the nail.
  - 2. Place a small amount of anhydrous calcium chloride or calcium sulphate crystals over the hole.
  - 3. Cover the crystals and the hole with a piece of flat glass and seal the edges with waterproof tape or putty. Since concrete pourings vary, repeat the test every 1500 sq. ft.
  - 4. Leave in place 72 hours. Any color change in the crystals indicates the presence of moisture. Do not apply carpet until slab is free of moisture and meets with approval of carpet adhesive manufacturer.
- D. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

### 3.3 INSTALLATION

#### A. General

- 1. Comply with manufacturer's instructions and recommendations. Maintain direction of pattern and texture, including lay of pile.
- 2. Adhere all tiles with a full spread of adhesive. Dry-fit cut tiles and apply adhesive to tile back after tile has been cut.
- 3. Tiles shall be installed in a monolithic corner to corner manner following arrows printed on back of each tile indicating pile direction. Tiles shall be installed to achieve patterns as directed by the Commissioner.
- 4. Vinyl reducer strips shall be used along any necessary open edges so as to maintain the fixed perimeter.

3.4 CLEANING UP

- A. Upon completion of the carpeting installation in each area, visually inspect all carpet installed in that area and immediately remove all dirt, soil, and foreign substance from the exposed face; inspect all adjacent surfaces and remove all marks and stains caused by the carpet installation; remove all packaging materials, carpet scraps, and other debris from the carpet installation to the area of the job site set aside for its storage.

3.5 PROTECTION

- A. In all areas, provide a temporary non-staining paper pathway in the direction of traffic.

END OF SECTION

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## SECTION 096816

### CARPET (GLUE DOWN)

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor materials, equipment, and services necessary to complete the carpet tile as shown on the drawings and/or specified herein, including, but not limited to, the following:

- 1. Carpet, glue down installation, including adhesive.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:
  - 1. Carpet shall have face fibers and/or backings that contain a minimum of 25% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section

2. Carpet installed in the building interior shall meet the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program.
  3. Carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.
  4. The VOC Content of all Carpet adhesives shall not exceed 50 g/l.
  5. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING)", where applicable. Certification of these products shall be in accordance with the Submittal Requirements of this Section.
  6. Products extracted and manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED BUILDING Submittal Requirements of this Section.
  7. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Installer Qualifications: Firm with not less than three (3) years of experience in installation of commercial carpeting of type, quantity and installation methods similar to work of this Section.
- D. General Terminology/ Information Standard: Refer to current edition of "Carpet Specifier's Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.
- E. Carpet used on Project must be from same dye lot for each carpet type.

#### 1.5 ENVIRONMENTAL CRITERIA

- A. Recycled Content:
1. Carpet shall have face fibers and/or backings containing a minimum of 15% (combined) post-industrial/post-consumer recycled content. The percentage of recycled content is based on the weight of the component materials.
- B. Adhesives:
1. Carpet adhesives shall meet the VOC limits and prohibited chemical limitations of the "Green Seal Environmental Standard for Certification of Commercial Adhesives" (GS-36), of Green Seal, Inc., Washington, DC.
- C. Emissions Testing:
1. Carpet and adhesives shall meet or surpass all criteria of the "Green Label" Indoor Air Quality Test Program established by the Carpet and Rug Institute (CRI) of Dalton, Georgia.

D. Product Labeling (for future recycling):

1. Carpet shall have Carpet Component Identification Codes as established by the Carpet and Rug Institute (CRI) of Dalton, Georgia. The labels shall be permanently printed or attached to the carpet backing. The codes shall identify, at minimum, the carpet's face fiber, primary backing, and secondary backing.

1.6 SUBMITTALS

A. LEED BUILDING Submittal Requirements The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits.
  5. Provide manufacturer documentation that the carpet tiles meet the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program, and carpet cushions meet the testing and product requirements of the Carpet and Rug Institute's Green Label program.
- B. Product Data: Submit manufacturer's complete technical product data for each type of carpet, cushion and accessory item required.
- C. Shop Drawings: Submit carpet layout and seaming drawings, clearly indicating carpet directions, locations and methods of jointing seams and locations and types of edge strips. Indicate columns, doorways, enclosing wall/partitions, built-in cabinets and locations where cut-outs are required in carpet.

- D. Samples: Submit 24" x 24" samples of each carpet required and six (6) inch long samples of each type exposed edge stripping.
- E. Certification: Submit manufacturer's certification stating that carpet materials furnished comply with specified requirements.
  - 1. Include listing of mill register numbers for carpet furnished.
  - 2. Include supporting certified laboratory test data indicating that carpet meets or exceeds specified test requirements.
- F. Maintenance Data: Submit manufacturer's printed maintenance recommendations, including methods and frequency recommended for maintaining carpet in optimum conditions under anticipated traffic and use conditions.

#### 1.7 EXTRA STOCK

- A. Produce and deliver to project at least five (5) percent overrun on calculated yardage. Provide required overrun exclusive of carpet needed for proper installation, waste and usable scraps.

#### 1.8 PRODUCT DELIVERY AND STORAGE

- A. Deliver carpeting materials in original mill protective wrapping with mill register numbers and tags attached. Store inside, in well ventilated area, protected from weather, moisture and soiling.

#### 1.9 WARRANTY

- A. The Contractor shall promptly repair seams and edges in the carpet as required, for a period of one (1) year after Substantial Completion of the Project. The exact time for this work shall be left to the discretion of the City of New York. Fourteen (14) day notice for repairs shall be given by the City of New York, so that the Contractor can make the necessary arrangements.
- B. The manufacturer shall provide a warranty that the face yarn of the carpet will not wear more than ten (10) percent in five years. If the carpet wears more than ten (10) percent in five (5) years, the manufacturer will replace the carpet including parts, labor and materials, to the City of New York's satisfaction.

### PART 2 PRODUCTS

#### 2.1 CARPETING

- A. As indicated on drawings.

#### 2.2 ACCESSORIES

- A. Provide vinyl edges, reducers and threshold plates where required. They shall be sized to be compatible with the thickness of the carpet, in a color as selected by the Commissioner, of a commercial quality as manufactured by Armstrong, Burke Mercer Industries or approved equal. The type shall be as required by site conditions, as is the

custom of the trade, and installation shall be made as recommended by the manufacturer.

- B. Adhesive: Provide adhesive as recommended by the carpet manufacturer. Provide adhesive which complies with flame spread rating required for the carpet installation, if any.
- C. Leveling Compound: Latex/Portland cement flash patching and leveling compound equal to No. DSP-520 made by H.B. Fuller or No. 226 with 3701 admixture made by Laticrete or equal made by Mapei, or approved equal.
- D. Miscellaneous Materials: Provide the types of seaming, adhesives and tape, thread, and other accessory items recommended by the carpet manufacturer and Installer for the conditions of installation and use.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where carpet is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 PRE-INSTALLATION REQUIREMENTS

- A. Floor shall be clean and free of cracks and protrusions. Any gaps or cracks more than 1/16" wide to be filled in with latex leveling compound. Protrusions must be sanded down smooth, the floor cleanly swept and vacuumed if necessary to remove all dust and grit.
- B. Floor temperature shall be 65 deg., at least 24 hrs. prior to installation; and 48 hrs. after carpet is installed.
- C. Conduct a moisture test. The presence of moisture in the concrete floor will interfere with the curing and subsequent performance of the adhesive. Conduct the test as follows:
  - 1. Drive a concrete nail a half inch into the floor. Then remove the nail.
  - 2. Place a small amount of anhydrous calcium chloride or calcium sulphate crystals over the hole.
  - 3. Cover the crystals and the hole with a piece of flat glass and seal the edges with waterproof tape or putty. Since concrete pourings vary, repeat the test every 1500 sq. ft.
  - 4. Leave in place 72 hrs. Any color change in the crystals indicates the presence of moisture. Do not apply carpet until slab is free of moisture and meets with approval of carpet adhesive manufacturer.

- D. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

### 3.3 INSTALLATION

#### A. General

1. Comply with manufacturer's instructions and recommendations. Place seams in the directions as accepted on shop drawings. Maintain direction of pattern and texture, including lay of carpeting.
2. Extend carpet under open-bottomed and raised-bottom obstructions, and under removable flanges of obstructions. Extend carpet into closets and alcoves of rooms indicated to be carpeted, unless another floor finish is indicated for such spaces. Extend carpet under all movable furniture and equipment, unless otherwise indicated.
3. Provide cut-outs for removable access devices in the substrate. Bind edges as neatly as possible and secure both sides of cuts to the substrate. Use double-faced tape on carpet cut-outs which must be lifted from the substrate to gain access to the devices. Cut only three (3) sides wherever it is feasible to provide a carpet flat in lieu of a fully-removable cut-out.
4. Install vinyl carpet edge guard at every location where edge of carpet is exposed to traffic, except where another device is indicated.

#### B. Direct Glue-Down Carpet Installation

1. Select best location for a starting seam; strike a chalk line on the floor at this point. (Use white chalk; colored chalk should not be allowed on the job.)
2. Check the carpet for direction of pile lay.
3. Cut two lengths of carpet allowing about one inch to run up the walls for trimming.
4. Place the untrimmed edge of one length along the chalk line and stay-nail along its center line, parallel to the seam. During this procedure, work out any wrinkles allowing the carpet to lie smoothly on the floor. Stay-nail at approximately 12" - 18" intervals following the center line of the cut along its entire length. Make sure carpet does not shift from the chalk line.
5. After checking for pile direction, unroll second length and overlap the edge of the first length by about 1" to 2". Stay-nail second length as in Para. 4 above.
6. Depending on construction, the carpet edge may be trimmed by one of the following techniques:
  - a. Utilizing a top cutter cut between the loops if rows are straight and the cut is not too long.
  - b. Scribe cut using a top cutter or cushion back cutter to follow a row on one edge, then overlap and use this cut edge as a guide to trim the second or bottom edge.

- c. Double cut using a top cutter, make a free hand cut through both overlapped edges. When cutting long areas, utilize an electric cutter.
  - d. All cut edges must be sealed prior to seaming using a premium latex carpet seaming adhesive.
7. Fold back both lengths towards stay-nails. Do not pull out any stay-nails or tear carpet.
  8. The exposed floor between the folded cuts shall be swept and vacuumed if necessary.
  9. Using a notched trowel 1/8" x 1/8" spread adhesive evenly, using a semi-circular motion to avoid excessive deposits and missed areas. The number of men required to spread the adhesive will depend on the areas to be covered. If the area is large, use 2 men, one on either side of the center, and have them work in opposite directions. Check the trowels occasionally to see that they are free of foreign matter and also that the 1/8" notch is maintained. It is important to allow sufficient open time in order to let the adhesive become tacky before adhering the carpet.
  10. After the adhesive is spread as described in Para. 9 above, lay the folded back edge of the first cut over the cement. To do this, the installers shall position themselves at intervals along the entire length of the fold and grasp the folded edge. Lift it up and walk towards the seam. The installer in the middle of the roll walks ahead, thus forming a wedge. Use a 100 lb. roller to smooth the fabric towards the seam.
  11. Next, grasp the folded edge of the second roll and place it over the adhesive as in Para. 10 with the exception that this flap should be walked in evenly rather than using the wedge method. Walk in all but one ft. of this and fold this amount back again.
  12. The installer shall now slide this edge until it tightly abuts the edge of the first roll. Hold the edge in place by kneeling on it and work the wrinkles out toward the unglued side.
  13. Continue the above procedure throughout the installation.
  14. While the cement is still tacky, the carpet must be pressed down along the wall and creased - the excess shall be trimmed.
  15. Cross-seaming can be accomplished by Scribe Cutting. Overlap the ends approximately 4". Cut the end with the yarn leaning toward the seam from the back with a straight edge. Use this end as a guide to cut the other end utilizing a top cutter or similar tool.
  16. Seal these ends the same as all other cut edges.
  17. Exposed edges shall always be protected by a vinyl edging. The vinyl edge shall be fastened to the floor with contract cement.

18. Stains caused by adhesive can be removed using a dry chlorinated or similar solvent. Apply solvent with a clean cloth using a blotting action. Do not saturate carpet with solvent. Dry with rag or tissue using a blotting and not a rubbing motion.

- C. Stairway Carpeting: Install by secure method, recognized to be durable and safe for traffic. Conceal edges and avoid making seams in areas of high wear. Match adjoining carpet installation in every way possible.

#### 3.4 CLEANING UP

- A. Upon completion of the carpeting installation in each area, visually inspect all carpet installed in that area and immediately remove all dirt, soil, and foreign substance from the exposed face; inspect all adjacent surfaces and remove all marks and stains caused by the carpet installation; remove all packaging materials, carpet scraps, and other debris from the carpet installation to the area of the job site set aside for its storage.
- B. Usable carpet pieces shall be turned over to the City of New York.

#### 3.5 PROTECTION

- A. Provide temporary, protection against soiling or damage of carpet for the remainder of the construction period.

END OF SECTION

## SECTION 097200

### WALLCOVERING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the wallcovering as shown on the drawings and/or specified herein.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Gypsum wallboard - Section 092900.
- F. Painting and Finishing - Section 099000.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Qualifications of Installers: For actual cutting and installation of wallcovering, use only thoroughly trained and experienced installers completely familiar with the installation recommendations of the manufacturer of the wallcovering used and completely familiar with the requirements of this work.
- C. Manufacturer's Recommendations: The installation recommendations of the manufacturer of the wallcovering used, when approved by the Commissioner, shall be the basis for acceptance or rejection of actual installation methods used in this work.

- D. Test Panels: Install three (3) test panels of full usable width, including one corner, in areas designated by the Commissioner. Replace test panels which are not acceptable to the Commissioner until satisfactory installation is achieved.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.

- B. Samples: Before any wallcovering is delivered to the job site, submit to the Commissioner samples of the full range of colors and patterns of wallcovering available from the selected manufacturer in the quality and type specified. Samples shall be a min. 36" x 36" in size.

- C. Manufacturer's Recommendations: Accompanying the samples, submit to the Commissioner copies of the manufacturer's current installation recommendations for the material proposed to be furnished and installed under this Section.

- D. A Certificate of Compliance shall be furnished indicating conformance to the specification requirements. This requirement may be waived if fabric and adhesive packages and containers delivered to the job carry labels indicating weight of materials and fire hazard classification.

#### 1.6 MAINTENANCE INSTRUCTION

- A. Furnish the City of New York with a copy of the fabric manufacturer's maintenance instructions. These instructions shall contain recommended cleaning materials,

application methods, and precautions to be followed in the use of cleaning materials which may be detrimental to the surface if improperly applied.

1.7 EXTRA WALLCOVERING

- A. Deliver to the City of New York sizable remnants for future patching purposes. Also furnish to the City of New York one (1) complete roll of each wallcovering used.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver and store all wallcovering in undamaged condition as packaged by the manufacturer, with manufacturer's seal and labels intact. Exercise care to prevent damage during delivery, handling and storage. Store all materials flat in a clean, dry area with maintained temperature above 40 deg. F.

1.9 ENVIRONMENTAL CONDITIONS

- A. Wallcovering should be installed only when normal temperature and humidity conditions approximate the same conditions that will exist when the building is occupied.
- B. Areas to receive wallcovering shall be a constant temperature of 70 deg. F. measured at base elevation and shall be maintained for 72 hrs. before, during and 48 hrs. after the application.
- C. Remove wallcovering from its packaging and allow to acclimatize to the area of installation 24 hrs.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Custom created matte colored printed vinyl wallcovering/wall graphic.
  - 1. Digital design file will be supplied to contractor by Commissioner.
- B. Manufacturers: Provide colored printed vinyl wallcovering/wall graphic as manufactured by Duggal, Coloredge Visual or Kamhi Kolor.

2.2 TACKABALE WALLCOVERING

- A. Tackable Wall Surfacing
  - 1. Provide resilient homogeneous, tackable surface material consisting of linseed oils, granulated cork, resin binders, mixed and calandered onto a natural burlap backing equal to Forbo Industries or approved equal. Uni-color shall extend throughout thickness of material; product shall contain no harmful by-products or carcinogens. Product shall conform to the following characteristics:
    - a. Width: 48"
    - b. Gauge: 1/8"

- c. Backing: Burlap.
- d. Material Flexibility: Will not crack or break around a 2-3/4" diameter cylinder.
- e. Fuel Contribution (ASTM E 84): Class II

2. Adhesive: Provide "Forbo 511 Plus" adhesive as recommended by manufacturer.

### 2.3 ACCESSORIES

- A. Adhesive: "Sure Grip Plus Mold and Mildew-Proof Commercial Wall Covering Adhesive" made by The Zinsser Co. Inc. or approved equal.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where the wallcovering is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 PREPARATION

- A. Remove wallcovering material from its packaging and allow to acclimatize to the area of installation 24 hrs. before application.
- B. Remove switchplates, wall plates, and surface-mounted fixtures, where wallcovering is to be applied.
- C. Prime and seal substrates in accordance with the wallcovering manufacturer's recommendations for the type of substrate materials to be covered.
- D. Surfaces to receive wallcovering shall be free from grit, loose particles and surface irregularities and shall meet the minimum requirements established by the wallcovering manufacturer. Fill all cracks and holes in gypsum board with patching compound and sandpaper smooth.
- E. Provide tarpaulins, drop cloths and other suitable covers to protect adjacent and underlying surfaces which are likely to be stained, spotted or otherwise marked by wallpaper paste and application operations.

### 3.3 INSTALLATION

- A. Place wallcovering panels consecutively in the order they are cut from rolls, including filling of spaces above or below openings. Hang by reversing alternate strips, except on match patterns.
- B. Apply adhesive to back of wallcovering following adhesive manufacturer's instructions, using roller or paste brush. Install seams vertically and plumb, and at least 6" away from any corner; horizontal seams will not be permitted. Place wallcovering continuously over internal and external corners, going 12" beyond outside corners and

6" at inside corners. Overlap seams and double-cut to assure tight closure. Roll, brush or use a broad knife to remove air bubbles, wrinkles, blisters and other defects. Cut wallcovering evenly to the edges of the outlet box or support.

- C. Trim selvages as required to assure color uniformity and pattern match at seams.
- D. Remove excess adhesive along finished seams using warm water and a clean sponge, and wipe dry.
- E. Install wallcovering with an intimate substrate bond, smooth, clean, without wrinkles, gaps and overlaps.
- F. Replace removed plates and fixtures to verify cut edges of wallcovering are completely concealed.
- G. Verify that pattern and color are as specified. If pattern is not random, examine for repeat in design.
- H. Hang smooth, non-match patterns by pasting strips on the wall, overlapping the edges, and "Double-Cutting" through both thicknesses. Use a 0.04" or 0.06" zinc or aluminum strip between wall and strip when cutting, to avoid gouging the wall.
- I. Use stiff-bristled brush or flexible board knife to eliminate air pockets and to secure the wallcovering to the wall surface.
- J. Fill spaces above and below doors and similar areas in sequence from the roll, not later than when all full length pieces have been installed.
- K. Examine each seam carefully when completed. Trim additional selvage where required to achieve a color and pattern match at seams.
- L. Apply wallcovering before the installation of plumbing fixtures, casings, bases and cabinets.

#### 3.4 PROTECTION

- A. Protect finished work installed by other trades prior to work under this Section. Replace any work damaged by workmen of this trade without cost to the City of New York.

#### 3.5 CLEAN-UP

- A. Any hardware, accessories, plates, etc., which are removed during wallcovering installation shall be replaced level and square.
- B. All debris resulting from work covered in this Section shall be removed from the building on a daily basis.

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## SECTION 099000

### PAINING AND FINISHING

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the painting and finishing as shown on the drawings and/or specified herein, including, but not limited to, the following:
  1. Prime painting unprimed surfaces to be painted under this Section.
  2. Painting all items furnished with a prime coat of paint, including touching up of or repairing of abraded, damaged or rusted prime coats applied by others.
  3. Painting all ferrous metal (except stainless steel) exposed to view.
  4. Painting all galvanized ferrous metals exposed to view.
  5. Painting interior concrete block exposed to view.
  6. Painting gypsum drywall exposed to view.
  7. Exterior wood surfaces.
  8. Painting of wood exposed to view, except items which are specified to be painted or finished under other Sections of these specifications. Back painting of all wood in contact with concrete, masonry or other moisture areas.
  9. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
  10. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items.
  11. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
  12. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, shall be included as though specified.

### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Shop priming is required on some, but not all of the items scheduled to be field painted. Refer to other Sections of work for complete description.
- F. Shop coat on machinery and equipment: Refer to the Sections under which various items of manufactured equipment with factory applied shop prime coats are furnished, including, but not necessarily limited to, the following Sections. All items of equipment furnished with prime coat finish shall be finish painted under this Section.
  - 1. Plumbing - Division 22.
  - 2. Heating, ventilation and air conditioning – Division 23.
- G. Wallcovering - Section 097200.
- H. Color Coding of Mechanical Piping and Electrical Conduits – Divisions 22 and 26.
  - 1. This Color Coding consists of an adhesive tape system and is in addition to painting of piping and conduits under this Section, as specified above.

### 1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

- A. Items of equipment furnished with complete factory finish, except for items specified to be given a finish coat under this Section.
- B. Factory-finished toilet partitions.
- C. Non-ferrous metals, except for items specified and/or indicated to be painted.
- D. Finished hardware, excepting hardware that is factory primed.
- E. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials resulting from the work of this Section.

### 1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:

1. Paints and coatings manufactured within 500 miles (by air) of the project site shall be documented in accordance with the LEED BUILDING Submittal Requirements of this Section.
2. Paints used for interior applications shall meet the volatile organic compound (VOC) and chemical component limitations of the Green Seal Paint Standards GS-11 and GC-03, of Green Seal, Inc., Washington, DC. Other architectural coatings shall meet the VOC limits as established in the South Coast Air Product-specific environmental requirements are as follows:

a. Volatile Organic Compounds: the VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by U. S. Environmental Protection Agency (EPA) Reference Test Method 24.

1). Interior Paints:

Non-flat:	150 grams/liter
Flat:	50 grams/liter

2). Interior Anti-Corrosive Paints (if used in interior applications):

Gloss:	250 grams/liter
Semi-gloss:	250 grams/liter
Flat:	250 grams/liter

3). Other Interior Coatings: Clear wood finishes, floor coatings, stains, sealers, and shellacs applied to the interior shall meet the VOC limitations defined in Rule 1113, "Architectural Coatings" of SCAQMD, of the State of California. The VOC limits defined by SCAQMD, based on 7/9/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

(1) Clear Wood Finishes	
(a) Varnish	350
(b) Sanding Sealers	350
(c) Lacquer	550
(2) Shellac	
(a) Clear	730
(b) Pigmented	550
(3) Stains	250
(4) Floor Coatings	100
(5) Waterproofing Sealers	250
(6) Sanding Sealers	275
(7) Other Sealers	200

The calculation of VOC shall exclude water and tinting color added at the point of sale.

- 4). Adhesives or sealants used for work in this section shall meet the requirements of Division 1, Section 018419: "Volatile Organic

Compound (VOC) Limits for Adhesives and Sealants”, where applicable.

- 5). Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. “Green Seal Environmental Standard for Paints” (GS-11), Green Seal, Washington, DC, [www.greenseal.org](http://www.greenseal.org)
  - D. “Green Seal Environmental Standard for Anti-Corrosive Paints (GC-03), Green Seal, Washington, DC, [www.greenseal.org](http://www.greenseal.org)
  - E. Job Mock-Up
    1. In addition to the samples specified herein to be submitted for approval, apply in the field, at their final location, each type and color of approved paint materials, applied 10 feet wide, floor to ceiling of wall surfaces, before proceeding with the remainder of the work, for approval by the Commissioner. Paint mock-ups to include door and frame assembly.
    2. These applications when approved will establish the quality and workmanship for the work of this Section.
    3. Repaint individual areas which are not approved, as determined by the Commissioner, until approval is received. Assume at least two paint mock-ups of each color and gloss for approval.
  - F. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces.
  - G. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon request from other subcontractors, furnish information on the characteristics of the finish materials proposed to be used, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Commissioner in writing of any anticipated problems using the coating systems as specified with substrates primed by others.
  - H. All paints must conform to the Volatile Organic Compounds (VOC) standards of prevailing codes and ordinances.
- 1.6 ENVIRONMENTALLY-PREFERABLE PRODUCT CRITERIA:
- A. VOC Content of Paints:
    1. The volatile organic compound (VOC) content of interior paints, interior primers, and anti-corrosive paints used in interior applications shall not exceed the limits defined in the Green Seal Environmental Standards for Paints (GS-11, dated 5/20/93) and Anti-Corrosive Paints (GC-03, dated 1/7/97), of Green Seal, Washington, DC. The VOC limits defined in the referenced Green Seal standards are as follows. All VOC limits are defined in grams per liter, and exclude water

and tinting color added at the point of sale (as determined by U.S. EPA Reference Test Method 24).

1.7 INTERIOR PAINTS AND ANTI-CORROSIVE PAINTS

A.

Non-flat:	150	Gloss:	250
Flat:	50	Semi-gloss:	250
		Flat:	250

B. Additional Chemical Component Restrictions in Paints:

1. To the extent feasible, interior paints, interior primers, and anti-corrosive paints used in interior applications shall comply with the following chemical component restrictions of the Green Seal Environmental Standards for Paints (GS-11, dated 5/20/93) and Anti-Corrosive Paints (GC-03, dated 1/7/97), of Green Seal, Washington, DC.
  - a. Aromatic Compounds: the product must contain no more than 1.0% by weight of the sum total of aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.
  - b. Other Chemicals: The manufacturer shall demonstrate that the following chemical compounds are not used as ingredients in the manufacture of the product.
    - 1). Halomethanes: methylene chloride
    - 2). Chlorinated ethanes: 1,1,1-trichloroethane
    - 3). Aromatic solvents: benzene, toluene (methylbenzene), ethylbenzene
    - 4). Chlorinated ethylenes: vinyl chloride
    - 5). Polynuclear aromatics: naphthalene
    - 6). Chlorobenzenes: 1,2-dichlorobenzene
    - 7). Phthalate esters: di (2-ethylhexyl) phthalate, butyl benzyl phthalate, di-n-butyl phthalate, di-n-octyl phthalate, diethyl phthalate, dimethyl phthalate
    - 8). Miscellaneous semi-volatile organics: isophorone
    - 9). Metals and their compounds: antimony, cadmium, hexavalent chromium, lead, mercury
    - 10). Preservatives (antifouling agents): formaldehyde
    - 11). Ketones: methyl ethyl ketone, methyl isobutyl ketone
    - 12). Miscellaneous volatile organics: acrolein, acrylonitrile

1.8 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits
- B. Materials List
1. Before any paint materials are delivered to the job site, submit to the Commissioner a complete list of all materials proposed to be furnished and installed under this portion of the work.
  2. This shall in no way be construed as permitting substitution of materials for those specified or accepted for this work by the Commissioner.
- C. Samples
1. Accompanying the materials list, submit to the Commissioner copies of the full range of colors available in each of the proposed products.
  2. Upon direction of the Commissioner, prepare and deliver to the Commissioner two (2) identical sets of Samples of each of the selected colors and glosses painted onto 8-1/2" x 11" x 1/4" thick material; whenever possible, the material for Samples shall be the same material as that on which the coating will be applied in the work.
- D. Manufacturer's Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable alternate in this Section of these specifications, submit for the Commissioner's review the current recommended method of application published by the manufacturer of the proposed material.

## 1.9 PRODUCT HANDLING

- A. Deliver all paint materials to the job site in their original unopened containers with all labels intact and legible at time of use.
- B. Protection
  - 1. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
  - 2. Use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
  - 3. Use all means necessary to protect paint materials before, during and after application and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## 1.10 EXTRA STOCK

- A. Upon completion of this portion of the Work, deliver to the City of New York an extra stock of paint equaling approximately ten (10) percent of each color and gloss used and each coating material used, with all such extra stock tightly sealed in clearly labeled containers.

## 1.11 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds eighty-five (85) percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
- D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

## PART 2 PRODUCTS

### 2.1 PAINT MANUFACTURERS

- A. Except as otherwise noted, provide the painting products listed for all required painting made by one of the manufacturers listed in the paint schedule (Section 2.4). These companies are Benjamin Moore, Akzo Nobel Paint (Glidden Professional) and Sherwin Williams (S-W). Pratt and Lambert Paint. Comply with number of coats and required minimum mil thicknesses as specified herein.

## 2.2 MATERIALS

- A. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.
- B. Colors and Glosses: All colors and glosses shall be as selected by the Commissioner. Certain colors will require paint manufacturer to prepare special factory mixes to match colors selected by the Commissioner. Color schedule (with gloss) shall be furnished by the Commissioner.
- C. Coloring Pigment: Products of or furnished by the manufacturer of the paint or enamel approved for the work.
- D. Linseed Oil: Raw or boiled, as required, of approved manufacture, per ASTM D 234 and D 260, respectively.
- E. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D 13.
- F. Shellac: Pure gum shellac (white or orange) cut in pure denatured alcohol using not less than four (4) lbs. of gum per gallon of alcohol.
- G. Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacture.
- H. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

## 2.3 GENERAL STANDARDS

- A. The various surfaces shall be painted or finished as specified below in Article 2.4. However, the Commissioner reserves the right to change the finishes within the range of flat, semi-gloss or gloss, without additional cost to the City of New York.
- B. All paints, varnishes, enamels, lacquers, stains and similar materials must be delivered in the original containers with the seals unbroken and label intact and with the manufacturer's instructions printed thereon.
- C. All painting materials shall bear identifying labels on the containers with the manufacturer's instructions printed thereon.
- D. Paint shall not be badly settled, caked or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.
- E. Paint shall arrive on the job color-mixed except for tinting of under-coats and possible thinning.
- F. All thinning and tinting materials shall be as recommended by the manufacturer for the particular material thinned or tinted.
- G. It shall be the responsibility of the Contractor to see that all mixed colors match the color selection made by the Commissioner prior to application of the coating.

2.4 SCHEDULE OF FINISHES

A. Exterior Painted Wood

Flat Finish

- Primer: 1 coat Moore's Fresh Start Moorwhite Primer (100)  
1 coat S-W A-100 Exterior Latex Primer B42
- First Coat: 1 coat MoorLife Flat Fortified Acrylic House Paint (105)  
1 coat S-W A-100 Exterior Latex Flat A6
- Second Coat: 1 coat MoorLife Flat Fortified Acrylic House Paint (105)  
1 coat S-W A-100 Exterior Latex Flat A6
- a. Total DFT not less than: 3.8 mils

Semi-Gloss Finish/Latex

- Primer: 1 coat Moore's Fresh Start Moorwhite Primer (100)  
1 coat S-W A-100 Exterior Latex Primer B42
- First Coat: 1 coat MoorGlo Soft Gloss Fortified Acrylic House Paint (096)  
1 coat S-W A-100 Exterior Latex Gloss A8
- Second Coat: 1 coat MoorGlo Soft Gloss Fortified Acrylic House Paint (096)  
1 coat S-W A-100 Exterior Latex Gloss A8
- a. Total DFT not less than: 4.0 mils

B. Exterior Galvanized Ferrous Metal

- Primer Moore IMC Acrylic Metal Primer (M04)  
Akzo Devflex 4020 FF DTM Primer/Flat Finish  
Sherwin-Williams Galvite HS Primer, B50WZ30  
Pratt and Lambert; 1 or 2 coats Steeltech Acrylic Prime or Finish,  
Z190
- First Coat: Moore Urethane Alkyd Gloss Enamel (Z22)  
Akzo Devflex 4216 High Performance WB Acrylic S/G  
Sherwin-Williams Industrial Enamel HS, B54Z-400  
Pratt and Lambert Enducryl DTM Acrylic, SCZ6611
- Second Coat: Same as recommended first coat.

C. High Performance Coating On Exterior Galvanized Ferrous Metals

- First Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; "Devran 203 WB Epoxy Primer" by Akzo; or "Recoatable Epoxy Primer 867-45" by Sherwin Williams.
- Second Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Vizethne" by Akzo; or "Hi-Solids Urethane B65-300/350" by Sherwin Williams.

D. High Performance Coating On Exterior Non-Galvanized Ferrous Metals

- Prime Coat: "Tneme-Zinc 90/97" by Tnemec; "Interzinc 52" or "315" by International Protective Coatings; "Carbozinc 859, Class B" by Carboline; "Cathacoat 302V Reinforced Inorganic Zinc Primer" by

- Akzo; or "Zinc Clad II Plus Inorganic Zinc Rich Coating B69V212" by Sherwin Williams.
- Second Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; "Bar-Rust 231V Multi Purpose Epoxy Mastic" by Akzo; or "Macropoxy G46 I.C. Epoxy B58-600" by Sherwin Williams.
- Third Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS" or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379H Aliphatic Urethane" by Akzo; or "Hi-Solids Polyurethane B65-300/350" by Sherwin Williams.

E. Interior Ferrous Metal

Satin Finish/Latex

- Primer: 1 coat Pro Industrial Pro-Cryl Universal Primer (B66-310) S-W
- First Coat: 1 coat AURA Satin Waterborne Interior Paint (522) BM  
1 coat ULTRA-WALL latex Satin Interior Wall Paint (1230) ICI
- Second Coat: 1 coat AURA Satin Waterborne Interior Paint (522) BM  
1 coat ULTRA-WALL Latex Satin Interior Wall Paint (1230)ICI

Semi-Gloss Finish/Latex

- Primer: 1 coat Pro Industrial Pro-Cryl Universal Primer (B66-310) S-W
- First Coat: 1 coat AURA Semi Gloss Waterborne Interior Paint (528) BM  
1 coat Pro Classic Waterborne Acrylic Semi-Gloss (B-31) S-W
- Second Coat: 1 coat AURA Semi Gloss Waterborne Interior Paint (528) BM  
1 coat Pro Classic Waterborne Acrylic Semi-Gloss (B-31) S-W

F. Interior Concrete and Concrete Block

Flat Finish/Vinyl Acrylic Latex over Filler

- Block Filler: 1 coat Moorcraft Super Craft Latex Block Filler (285) BM  
1 coat S-W Preprite Block Filler White, B25W25 S-W
- First Coat: 1 coat AURA Matte Waterborne Interior Paint (522) BM  
1 coat ULTRA-WALL Latex Flat Interior Wall Paint (1230) ICI
- Second Coat: 1 coat AURA Matte Waterborne Interior Paint (522) BM  
1 coat ULTRA-WALL Latex Flat Interior Wall Paint (1230) ICI

Eggshell Finish/Vinyl Acrylic Latex over Filler

- Block Filler: 1 coat Moorcraft Super Craft Latex Block Filler (285) BM  
1 coat S-W Preprite Block Filler White, B25W25 S-W
- First Coat: 1 coat AURA Eggshell Waterborne Interior Paint (524) BM  
1 coat CUSTOM HOME Latex Flat Eggshell Enamel (1493) ICI
- Second Coat: 1 coat AURA Eggshell Waterborne Interior Paint (524) BM  
1 coat CUSTOM HOME Latex Flat Eggshell Enamel (1493) ICI

Semi-Gloss Finish/Vinyl Acrylic Latex over Filler

- Block Filler: 1 coat Moorcraft Super Craft Latex Block Filler (285) BM  
1 coat Seal-Crete Waterproofing Sealer - Zero VOC (101) MAB

	1 coat S-W Preprite Block Filler White, B25W25	S-W
First Coat:	1 coat AURA Semi Gloss Waterborne Interior Paint (528)	BM
	1 coat Enviro-Pure Semi-Gloss - Zero VOC (047)	MAB
	1 coat CUSTOM HOME Latex Flat Semi-Gloss Enamel (1493)	ICI
Second Coat:	1 coat AURA Semi Gloss Waterborne Interior Paint (528)	BM
	1 coat Enviro-Pure Semi-Gloss - Zero VOC (047)	MAB
	1 coat CUSTOM HOME Latex Flat Semi-Gloss Enamel (1493)	ICI

G. Interior Drywall

Flat Finish/Vinyl Acrylic Latex

Primer:	1 coat Pristine Eco Spec Interior Latex Primer (231)	BM
	1 coat HARMONY Interior Latex Primer (B11W900)	S-W
First Coat:	1 coat AURA Matte Waterborne Interior Paint (522)	BM
	1 coat ULTRA-WALL Latex Flat Interior Wall Paint 1230)	ICI
	1 coat HARMONY Interior Latex Flat (B5)	S-W
Second Coat:	1 coat AURA Matte Waterborne Interior Paint (522)	BM
	1 coat ULTRA-WALL Latex Flat Interior Wall Paint 1230)	ICI
	1 coat HARMONY Interior Latex Flat (B5)	S-W

Eggshell Finish/Vinyl Acrylic Latex

Primer:	1 coat Pristine Eco Spec Interior Latex Primer (231)	BM
	1 coat PREP & PRIME AQUACRYLIC GRIPPER (3210)	S-W
First Coat:	1 coat AURA Eggshell Waterborne Interior Paint (524)	BM
	1 coat HARMONY Interior Latex EG-SHEL (B9)	S-W
Second Coat:	1 coat AURA Eggshell Waterborne Interior Paint (524)	BM
	1 coat HARMONY Interior Latex EG-SHEL (B9)	S-W

H. Interior Painted Wood:

Eggshell Satin Finish/Latex

Primer:	1 coat Pristine Eco Spec Interior Latex Primer (231)	BM
First Coat:	1 coat AURA Satin Waterborne, Interior Paint (526)	BM
	1 coat ULTRA-WALL Latex Satin Interior Wall Paint	ICI
	1 coat HARMONY Interior Latex Satin Eggshell (B9)	S-W
Second Coat:	1 coat AURA Satin Waterborne, Interior Paint (526)	BM
	1 coat ULTRA-WALL Latex Satin Interior Wall Paint	ICI
	1 coat HARMONY Interior Latex Satin (B9)	S-W

Semi-Gloss Finish/Latex

Primer:	1 coat Pristine Eco Spec Interior Latex Primer (231)	BM
	1 coat Harmony Low Odor Interior Latex Primer (B11W900)	S-W
First Coat:	1 coat AURA Semigloss Waterborne Interior Paint (528)	BM
	1 coat Harmony Low Odor Interior Latex Semi-Gloss (B10)	S-W
	1 coat CUSTOM HOME Latex Semi-Gloss Enamel (1497)	ICI
Second Coat:	1 coat AURA Semigloss Waterborne Interior Paint (528)	BM
	1 coat Harmony Low Odor Interior Latex Semi-Gloss (B10)	S-W
	1 coat CUSTOM HOME Latex Semi-Gloss Enamel (1497)	ICI

High Gloss Finish/Latex

Primer: 1 coat Mythic No-VOC Multi-Purpose Latex Primer  
First Coat: 1 coat Mythic Paint Interior Latex High Gloss  
Second Coat: 1 coat Mythic Paint Interior Latex High Gloss

I. Interior Drywall to Receive Wallcovering

Primer: 1 coat "Shield Z Mold and Mildew Proof Commercial Wallcovering Primer" made by Zinsser or "Wall Grip" by Benjamin Moore  
1 coat Pratt and Lambert; Suprime Interior Pre-Wallcovering Primer Z100

2.5 EXISTING SURFACES TO BE PAINTED

- A. Existing surfaces shall be painted in accordance with schedule given in Article 2.4 herein except that first or prime coat may be eliminated where existing paint is sound. Where existing paint must be removed down to base material, provide first or prime coat as specified.

2.6 PIPING AND MECHANICAL EQUIPMENT EXPOSED TO VIEW

- A. Paint all exposed piping, conduits, ductwork and mechanical and electrical equipment. Use heat resisting paint when applied to heating lines and equipment. The Contractor is cautioned not to paint or otherwise disturb moving parts in the mechanical systems. Mask or otherwise protect all parts as required to prevent damage.
- B. Exposed Uncovered Ductwork, Piping, Hangers and Equipment: Latex Enamel Undercoater and one (1) coat Acrylic Latex Flat.
- C. Exposed Covered Piping, Duct Work and Equipment: Primer/Sealer and one (1) coat Acrylic Latex Flat.
- D. Panel Boards, Grilles and Exposed Surfaces of Electrical Equipment: Latex Enamel Undercoater and two (2) coats Latex Semi-Gloss.
- E. Equipment or Apparatus with Factory-Applied Paint: Refinish any damaged surfaces to match original finish. Do not paint over name plates and labels.
- F. All surfaces of insulation and all other work to be painted shall be wiped or washed clean before any painting is started.
- G. All conduit, boxes, distribution boxes, light and power panels, hangers, clamps, etc., are included where painting is required.
- H. All items of Mechanical and Electrical trades which are furnished painted under their respective Contracts shall be carefully coordinated with the work of this Section so as to leave no doubt as to what items are scheduled to be painted under this Section.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where painting and finishing are to be applied and correct any conditions detrimental to the proper and timely completion of the work. Do

not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 GENERAL WORKMANSHIP REQUIREMENTS

- A. Comply, at minimum, with paint manufacturer recommendations for space ventilation during and after installation. Where feasible, the following ventilation conditions shall be maintained during the paint curing period, or for 72 hours after application: 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 85 degrees F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in item 2 above.
- B. To the extent practical, allow paint installations to cure *prior to* the installation of materials that adsorb VOCs. Materials that adsorb VOCs include carpets, textiles, and acoustical ceiling panels.
- C. Only skilled mechanics shall be employed. Application may be by brush or roller. Spray application only upon acceptance from the Commissioner in writing.
- D. The Contractor shall furnish the Commissioner a schedule showing when he expects to have completed the respective coats of paint for the various areas and surfaces. This schedule shall be kept current as the job progresses.
- E. The Contractor shall protect his work at all times, and shall protect all adjacent work and materials by suitable covering or other method during progress of his work. Upon completion of the work, he shall remove all paint and varnish spots from floors, glass and other surfaces. He shall remove from the premises all rubbish and accumulated materials of whatever nature not caused by others and shall leave his part of the work in clean, orderly and acceptable condition.
- F. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide ample in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.
- G. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.
- H. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.
- I. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the City of New York.
- J. All coats shall be dry to manufacturer's recommendations before applying succeeding coats.

- K. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

### 3.3 PREPARATION OF SURFACES

- A. Existing Surfaces: Clean existing surfaces requiring paint or finishing, remove all loose and flaking paint or finish and sand surface smooth as required to receive new paint or finish. No "telegraphing" of lines, ridges, flakes, etc., through new surfacing is permitted. Where this occurs, Contractor shall be required to sand smooth and re-finish until surface meets with Commissioner's approval.

- B. General

1. The Contractor shall be held wholly responsible for the finished appearance and satisfactory completion of painting work. Properly prepare all surfaces to receive paint, which includes cleaning, sanding, and touching-up of all prime coats applied under other Sections of the work. Broom clean all spaces before painting is started. All surfaces to be painted or finished shall be perfectly dry, clean and smooth.
2. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

- C. Metal Surfaces

1. Weld Fluxes: Remove weld fluxes, splatters, and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.
2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces, where solder flux has been used, with benzene. Clean surfaces by flushing with mineral spirits. For aluminum surfaces, wipe down with an oil free solvent prior to application of any pre-treatment.
  - a. Bare metal to receive high performance coating specified herein must be blast cleaned SSPC SP-6 prior to application if field applied primer; coordinate with steel trades furnishing ferrous metals to receive this coating to insure that this cleaning method is followed.
3. Shop Primed Metal: Clean off foreign matter as specified for "Bare Metal." Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.
4. Galvanized Metal: Prepare surface as per the requirements of ASTM D 6386.

5. Metal Filler: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with an approved metal filler suitable for the purpose and meeting the requirements of the related Section of work; after setting, sand to a smooth, hard finish, flush with adjoining surface.
- D. Gypsum Drywall Surfaces: Scrape off all projections and splatters, spackles all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards established in Section 092900, "Gypsum Drywall."
- E. Wood Surfaces: Sand to remove all roughness, loose edges, splinters, or splinters and then brush to remove dust. Wash off grease or dirt with an approved cleaner. Fill all cracks, splits, nail holes, screw holes, and surface defects with putty after the priming coat has been applied. Putty shall be brought up flush with the surface and sanded smooth and touched-up with primer when dry.
- F. Block Masonry Surfaces: Thoroughly clean off all grit, grease, dirt mortar drippings or splatters, and other foreign matter. Remove nibs or projections from masonry surfaces. Fill cracks, holes or voids, not filled under the "Masonry" Section, with Portland cement grout, and bag surface so that it has approximately the same texture as the adjacent masonry surface.
- G. Testing for Moisture Content: Contractor shall test all plaster, masonry, and drywall surfaces for moisture content using a reliable electronic moisture meter. Contractor shall also test latex type fillers for moisture content before application of top coats of paint. Do not apply any paint or sealer to any surface or to latex type filler where the moisture content exceeds seven (7) percent as measured by the electronic moisture meter.
- H. Touch-Up: Prime paint all patched portions in addition to all other specified coats.

### 3.4 MATERIALS PREPARATION

- A. Mix and prepare painting materials in strict accordance with the manufacturer's directions.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
- D. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

### 3.5 APPLICATION

- A. General

1. Apply paint by brush or roller in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the paint manufacturer for material and texture required.
2. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between each enamel or varnish coat application with fine sandpaper, or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
3. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - a. "Exposed surfaces" is defined as those areas visible when permanent or built-in fixtures, convactor covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.
5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint, before final installation of equipment.
6. Paint the back sides of access panels, removable or hinged covers to match the exposed surfaces.
7. Finish doors on tops, bottoms, and side edges the same as the faces, unless otherwise indicated.
8. Enamel finish applied to wood or metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface.
9. Paste wood filler applied on open grained wood after beginning to flatten, shall be wiped across the grain of the wood, then with a circular motion, to secure a smooth, filled, clean surface with filler remaining in open grain only. After overnight dry, sand surface with the grain until smooth before applying specified coat.

#### B. Scheduling Painting

1. Apply the first coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
2. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel

sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

- C. Prime Coats: Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- D. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.
- E. "Touching-Up" of Factory Finishes: Unless otherwise specified or shown, materials with a factory finish shall not be painted at the project site. To "touch-up," the Contractor shall use the factory finished material manufacturer's recommended paint materials to repair abraded, chipped, or otherwise defective surfaces.

### 3.6 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as acceptable to the Commissioner.
- B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

### 3.7 CLEAN UP

- A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
- B. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

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SECTION 099646

INTUMESCENT PAINTING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the intumescent fireproofing on existing and new fireproofed steel exposed to view, as indicated on drawings and as specified herein, including, but not limited to, the following:
  - 1. Intumescent fireproofing for exposed steel at HSs outriggers that project from the west wall and hold up the open stair as indicated on the drawings.
  - 2. High-performance coating.

1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Structural steel - Section 051200.

1.4 REFERENCES

- A. Publications listed herein are part of this specification to the extent referenced.
- B. American Society for Testing and Materials: ASTM E 119 Method for Fire Tests of Building Construction and Materials.
- C. Warnock Hersey - 2001 Certification Listings.

- D. Underwriters' Laboratories, Inc. - List of Equipment and Materials.
- E. Steel Structures Painting Council (SSPC) Surface Preparation Standards.

1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  - 2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  - 5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Product Data: Submit manufacturer's literature describing product characteristics, performance, and limitation criteria, including thickness for typical shape, curing time and application sequence.
  - 1. The Commissioner will choose a top coat color in a semi-gloss (low luster) finish which the manufacturer will match.
  - 2. Submit schedule of material thickness for members to receive intumescent coating.
- C. Samples
  - 1. Submit two (2) samples of the intumescent fireproofing.
  - 2. The manufacturer shall provide stepped samples applied to the same material as the finished installation. The first or lowest layer is the specified primer. The

middle layer is the intumescent fireproofing. The top coat is an aliphatic polyurethane enamel protective top coat. The finished application will have a smooth paint-like finish.

D. Quality Assurance Submittals

1. Test Designs/Results: Submit test designs for intumescent fireproofing prepared by a nationally recognized, certified, independent testing laboratory indicating full compliance with specified fire resistance performance requirements.
2. Certificates
  - a. Provide certification that contractor/applicator utilized for application of intumescent fireproofing is approved by manufacturer.
  - b. Provide certification that specialized equipment as may be recommended by manufacturer for proper application of intumescent fireproofing shall be utilized for work of this section.
3. Manufacturer's Instructions: Submit manufacturer's installation procedures which shall be basis for accepting or rejecting actual installation procedures.

1.6 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Qualifications
  1. Applicators shall be trained and qualified in techniques and procedures for proper application and shall demonstrate a minimum of three (3) years' successful experience in such application.
  2. Single Source Responsibility
    - a. Intumescent fireproofing, decorative, protective, top coat shall be products from a single manufacturer or approved for use by the manufacturer.

- b. Provide primers and other undercoat materials which are produced or are specifically recommended by manufacturer of intumescent fireproofing to ensure compatibility of system.
  
- C. Certifications: Intumescent fireproofing materials shall bear classification marking by Warnock Hersey, UL or other nationally recognized testing agency using ASTM standards and having a factory inspection service subject to approval of authorities having jurisdiction. Products shall be manufactured under testing agency's follow-up program.

#### 1.7 DELIVERY, STORAGE, HANDLING

##### A. Packing, Shipping, Handling, and Unloading

- 1. Deliver products factory mixed, ready for application, in manufacturer's original unopened containers. Each container shall have manufacturer's label, intact and legible.
- 2. Include on the label for each container:
  - a. Manufacturer's name and address.
  - b. Type of coating.
  - c. Referenced Warnock Hersey, UL or nationally certified testing laboratory design number.
  - d. Warnock Hersey, UL or national certified testing laboratory seal.

##### B. Storage and Protection

- 1. Store materials in a clean, dry, protected area. Stack containers raised off ground, using blocking or skids to provide drainage.
- 2. Store materials at temperatures not less than 40 deg. F.
- 3. Protect material from freezing.
- 4. Discard materials which come in contact with contaminants or water, prior to actual use. Remove damaged materials from site.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Intumescent fireproofing shall not commence or proceed when steel surfaces are below 40 deg. F. or when ambient temperature is less than 40 deg. F. or expected within 24 hours.
- B. Relative humidity shall not exceed 80% throughout total period of application and drying of intumescent fireproofing, and shall not exceed 85% throughout application and drying period for protective decorative finish coat, unless approved by the manufacturer prior to application.
- C. Provide ventilation in areas to receive intumescent fireproofing during and for 24 hours following application to dry materials.

## 1.9 SEQUENCING AND SCHEDULING

- A. Schedule application of intumescent fireproofing with the General Contractor. The General Contractor shall coordinate preparation and primer application with steel fabricators along with repairs and repriming of welds.
- B. Do not apply intumescent fireproofing until concrete toppings have been installed.
- C. Sequence work in conjunction with placement of hanger tabs, mechanical component hangers, electrical devices and any other similar devices connected to members scheduled to be coated.
- D. Steel surfaces with less than 36" clear working access may necessitate application of material to inaccessible surfaces prior to erection of finished steel members, either at point of fabrication or on-site.

## PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design
  - 1. Intumescent Fireproofing: Carboline Nullifire Series S; S606.
  - 2. Primer: Shop applied as specified in Structural Drawings.
  - 3. Protective Finish Coat: Carboline coating.
- B. Products manufactured by Contego, Albi-Clad, and Cafco Inc. shall be considered as equivalent if surface finish, texture, thickness, and specified material characteristics comply with the conditions shown for this Project, and manufacturer can provide above certifications.

## 2.2 MATERIALS

- A. Intumescent Fireproofing: Solvent, thin-film fireproofing.
  - 1. Color: Manufacturer's standard color to be maintained for the intumescent fireproofing material without colorants or additives that will affect UL rating.
  - 2. Ratings: As indicated on drawings.
  - 3. Properties
    - a. Surface Burning Characteristics: ASTM E 84.
      - 1). Flame Spread: Less than 15.
      - 2). Smoke Developed: Less than 65.
    - b. Hardness (Shore D): D65.
    - c. Impact: 67 in-pounds.
- B. Intumescent Filler Paste: As approved by manufacturer.
- C. Sealer/Primer: Provide sealer/primer tinted differently from intumescent coating and appropriate base for finish top coat.
- D. Protective Finish Top Coat
  - 1. Custom color and matte finish, as selected by Commissioner. Provide top coat per UL test design.
  - 2. Products
    - a. Finish Coat (Field Applied): Compatible with, and of the same manufacturer as, the primer and the intermediate coat. High-build, aliphatic polyurethane, semi-gloss (low luster) finish, one of the following:
      - 1). "Carbothane 133 HB" (Carboline Co.); 3.0 to 5.0 mils d.f.t.
      - 2). "Series 180 Endura-Shield III (A2143)" (Tnemec Co. Inc.); 4.0 mils d.f.t.
      - 3). "Imron 333" (DuPont); 3.0 to 5.0 mils d.f.t.

## 2.3 EQUIPMENT

- A. Spray and roller equipment shall be as recommended by intumescent coating manufacturer.
- B. Dry film thickness gauge.
- C. Air movement equipment.
- D. Dehumidification equipment.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Site Verification of Conditions
  - 1. Examine surfaces and conditions under which intumescent fireproofing is to be applied. Report any defects which may affect the work of this Section.
  - 2. Confirm compatibility of surfaces to receive fireproofing materials prior to application of fireproofing. Steel surfaces shall be primed with a compatible primer. The primer must be approved by the intumescent fireproofing manufacturer prior to shop priming to ensure sufficient adhesion. Coordinate work with requirements for structural steel as indicated in Structural Drawings to insure proper coordination.
  - 3. Applicator shall submit in writing certifications of substitute acceptance prior to proceeding with application of fireproofing.
  - 4. Correct conditions detrimental to timely and proper execution of work.
  - 5. Verify that all clips, hangers, sleeves and similar devices have been attached.
  - 6. Do not proceed until unsatisfactory conditions have been corrected. Beginning application indicates acceptance of substrate surfaces.

### 3.2 PREPARATION

- A. Clean substrate free of dust, dirt, grease or other foreign matter which would impair bond of fire resistance materials.

### 3.3 PROTECTION

- A. Protect adjacent surfaces and equipment from overspray of sprayed fireproofing materials.

### 3.4 APPLICATION

#### A. Intumescent Fireproofing

1. Prior to application, allow materials to reach same temperature as surface temperature of steel by storing unopened containers in areas where application is to take place.
2. No spackle compound, gypsum basecoats, additives to intumescent paint fireproofing (other than reducers approved by the manufacturer) will be acceptable.
3. Thoroughly mix intumescent fireproofing in accordance with manufacturer's instructions and apply in sufficient thickness to achieve the fire resistance rating. Apply in as many passes as necessary to cover, with uniformed texture.
4. Apply intumescent fireproofing in strict adherence with manufacturer's instructions by spray method. Brush or roller application shall be allowed only when spray application is not practical.
5. Spray apply material using heavy duty, self-cleaning (reversible), type tip. Increase distance between tip and surface if necessary to adjust orange peel effect due to pressure. Adjust fan width accordingly.
6. Fireproofing material dries quickly, a viscosity increase may be experienced after container has been opened. Keep container covered as much as possible during application. Use recirculation feature on spray equipment at all times, especially at breaks or interruptions during spraying.
7. When applying fireproofing with roller or brush, work from small containers, mixing frequently. Original pail shall be kept tightly closed and surface of material covered with plastic sheet provided for that purpose.
8. Fireproofing materials are designed for high build with minimum number of coats; however do not exceed 40 mils per dry coat, as shrinkage may occur.
9. Follow manufacturer's recommendations for recoat times and times to finish coat.
10. Final thickness shall be measured by dry film thickness gage. Do not apply protective top coat until it has been determined that required dry film thickness of intumescent fireproofing has been provided.
11. All runs, sags, orange peel in excess of 1/32" (peak to valley), depressions shall be sanded to achieve a uniform appearance in selected high finish areas.
12. Protect base coat from running water during curing process and finish coat.

B. Protective Finish Top Coat

1. Apply protective finish top coat in strict compliance with manufacturer's instructions by spray method.
2. Spray apply material using airless spray where contained and in selected high finish areas.
3. Apply protective finish top coat in compliance with wet and dry film thickness and spreading rates as recommended by manufacturer. Thickness of protective finish coat shall not exceed 4 mils dry per coat.
4. In the event of damage or other reason a portion of a member receiving the intumescent coating cannot be painted at the time of the final coat the entire member shall be repainted. Patches are not acceptable.
5. Drying time between coats will vary with ambient temperature and humidity conditions. Successive coats shall not be applied until previous coat is dry to touch (approximately 16 hours at 77 deg. F. and 50% relative humidity).

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: The City of New York will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
  1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing and inspecting of completed applications of intumescent material will take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of fire-resistive material for the next area until test results for previously completed applications of fire-resistive material show compliance with requirements.
  1. The intumescent coating thickness shall be measured in accordance with Technical Manual 12-B, "Standard Practice of the Testing and Inspection of Field Applied Thin-Film Intumescent Fire Resistive Materials: An Annotated Guide," published by the Association of the Wall and Ceiling Industries.
  2. When testing discovers applications of fire-resistive material not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.
- C. Remove and replace applications of intumescent material where test results indicate that they do not comply with specified requirements.

- D. Apply additional fire-resistive material per manufacturer's written instructions where test results indicate that thickness does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION

## SECTION 101400

### IDENTIFYING DEVICES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Provide all labor, materials, equipment and services, and perform all operations in connection with the furnishing and installing of identifying devices, complete in accordance with the Drawings and Specifications.
  - 1. Panel signs.
  - 2. Field-applied, vinyl-character signs.
  - 3. Aluminum plate with artwork.
  - 4. Dimensional letters and numbers.
  - 5. Plaque.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Carpentry - Section 062000.
- F. Exit signs - Division 26.

##### 1.4 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.

2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of unit.
- C. Shop Drawings: Include plans, elevations and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.
- D. Samples for Initial Selection: For each type of sign material indicated that involves color section.
1. Dimensional Characters: Full-size samples of each type of dimensional character (letter and number) required. Show character style, material, finish, and method of attachment.
  2. Panel Signs: Submit samples of each sign showing finishes, colors, surface textures and qualities of manufacture and design of each sign component, including graphics.
  3. Approved samples will not be returned for installation into Project.

#### 1.5 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

- B. Installer Qualifications: An employer of workers trained and approved by signage manufacturer.
- C. Source Limitations: Obtain each sign type through one source from a single manufacturer.
- D. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions and Barrier Free Regulations as adopted by authorities having jurisdiction.

#### 1.6 PROJECT CONDITIONS

- A. Field Measurements: Where sizes of signs are determined by dimension of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturer's ordering instructions and Lead Time requirements to avoid construction delays.
- B. Deliver products in manufacturers original, unopened, undamaged containers.
- C. Store products protected from weather, temperature and other harmful conditions as recommended by manufacturer.
- D. Handle products in accordance with manufacturer's instructions.

### PART 2 PRODUCTS

#### 2.1 PANEL SIGNS

- A. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16-inch measured diagonally from corner to corner, manufactured from acrylic sheet, unframed. Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, of letters, numbers, and other graphic devices.
- C. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surfaces, in contrasting color.
- D. Material: Acrylic Sheet conforming to ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
- E. Acceptable Manufacturers for Panel Signs: Subject to compliance with requirements, provide interior panels signs manufactured by ASI Sign Systems, Inc., or equivalent of Best Sign Systems, Inc., Mohawk Sign Systems, or approved equivalent.

- F. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures, or other characteristics related to appearance, provide colors and surface textures as selected by Commissioner.

## 2.2 ADHESIVE VINYL-CHARACTER LETTERING

- A. Provide prespaced characters die cut from 3- to 3.5-mil thick, weather-resistant vinyl film with release liner on the back and carrier film on the front, for application to glass; size, text and font as indicated or as selected by the Commissioner.

- 1. Digital design file will be supplied to contractor by Commissioner.

- B. Manufacturers: Provide vinyl lettering as manufactured by Duggal, Coloredge Visual or Kamhi Kolor.

## 2.3 ALUMINUM PLATE WITH ARTWORK

- A. Provide powder coated 1/8" thick aluminum plate.

- 1. Background color: White

- 2. Artwork color: Match Pantone Cool Gray 8c

- 3. Digital design file will be supplied to contractor by Commissioner.

## 2.4 DIMENSIONAL LETTERS AND NUMBERS

- A. Fabricated Channel Characters: Form exposed faces and sides of characters to produce surfaces free from warp and distortion. Include internal bracing for stability and attachment of mounting accessories. Comply with the following requirements.

- 1. Character Material: Stainless steel sheet, not less than 0.050" thick for face and 0.031" thick for returns.

- 2. Finish: No. 4.

## 2.5 CAST PLAQUE AT ENTRY LOBBY

- A. Casting shall be free from pits, scale, sand holes, or other defects. Comply with requirements specified for material, border style, background texture, and finish and with requirements shown for thickness, size, shape, and copy. Hand-tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish. Refer to the "Finishes" Article for other finish requirements.

- 1. Plaque Material: 0.75" Bronze.

- 2. Provide plaque of design indicated on drawings.

- 3. Mounting: 10-32 Pin Mount and Silicone.

- 4. Graphic Artwork File: To be provided by Commissioner.

- 5. Finish: Satin short grain horizontal, pebbled light oxide background.

6. Fabrication: Provide unit free of pits, scale and sand holes or other defects, with raised letters, numbers and characters. Hand tool and buff to provide clean, sharp figures with bright finish. Protect exposed surfaces with 2 coats of clear, non-yellowing lacquer.
7. Provide shop drawings and obtain approval from the Commissioner and the City of New York prior to fabrication of the plaque.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.
  1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
- B. Field-Applied, Vinyl-Character Signs: Clean and dry substrate. Align sign characters in final position before removing release liner. Remove release liner in stages, and apply and firmly press characters into final position. Press from the middle outward to obtain good bond without blisters or fishmouths. Remove carrier film without disturbing applied vinyl film.
- C. Dimensional Letters and Numbers: Mount letters and numbers using standard fastening methods recommended by the manufacturer for letter form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish letter spacing and to locate holes for fasteners.
  1. Projected Mounting: Mount letters at the projection distance from the wall surface indicated.

#### 3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturers written instructions. Protect signs from damage until acceptance by the City of New York.

END OF SECTION

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## SECTION 102114

### TOILET PARTITIONS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the toilet partitions as shown on the drawings and/or specified herein:
  - 1. Floor mounted stainless steel toilet partitions.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Gypsum board partitions - Section 092116.
- F. Ceramic tile - Section 093013.
- G. Toilet accessories - Section 102813.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. LEED BUILDING Performance Criteria: The following criteria are REQUIRED for the products included in this section:

1. Metal members shall contain a minimum of 35% (combined) post-industrial/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Submittal Requirements of this Section.
  2. Metal members fabricated within, and containing raw materials extracted within, 500 miles (by air) of the project site shall be documented in accordance with the Submittal Requirements above.
  3. Adhesives or sealants used for work in this section shall meet the requirements of Section 018419: Volatile Organic Compound (VOC) Limits For Adhesives, Sealants, Paints and Coatings (LEED BUILDING), where applicable.
  4. Certification of these products shall be in accordance with the LEED BUILDING Submittal Requirements of this Section.
- C. Field Measurements: Take field measurements prior to fabrication to ensure proper fitting of the work.
- D. Inserts and Anchorages: Furnish inserts and anchoring devices which must be built into other work for the installation of toilet partitions and related work. Coordinate delivery with other work to avoid delay.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. A completed ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications. Information to be supplied includes:
    - a. The amount of recycled content in the insulation product(s). Identify post-consumer and/or post-industrial recycled content.
    - b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the products.
    - c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
  2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
  3. Product Cut Sheets for all materials that meet the LEED BUILDING Performance criteria, as per the QUALITY ASSURANCE requirements of this Section. Cut sheets shall be submitted with the Contractor or Subcontractor's stamp, as confirmation that the submitted products are the products installed in the project.
  4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile

Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

- B. Shop Drawings: Before any of the materials of this Section are delivered to the job site, submit the following:
  - 1. Room layouts and elevations for all areas, with dimensions based on actual dimensions taken at job site.
  - 2. Materials, finishes, details of construction, gauges of metal, hardware, fastening and anchoring conditions and relation to adjoining constructions.
- C. Samples: Submit the following:
  - 1. One 12" x 12" sample of stainless steel finish.
  - 2. One sample of each type of hardware and fitting item including related fasteners. Include all items listed under 2.2 C. below.
- D. Templates: Submit templates to other trades as required for support of toilet partitions.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Provide stainless steel floor mounted toilet partitions urinal screens, as manufactured by Hadrian Manufacturing, or equivalent product of Global Steel Products Corp., Knickerbocker Partition Corporation, or approved equal.

### 2.2 MATERIALS

- A. Construction: Doors, Panels and Pilasters shall be constructed of two sheets of panel flatness Type 304, #4 brushed finish stainless steel, laminated under pressure to a "Verticel" (1/2") honeycomb core for impact resistance, rigidity and sound deadening. Formed edges to be welded together and interlocked, under tension, with a roll-formed oval crown locking bar, mitred, welded and ground smooth at the corners. Honeycomb to be of virgin, long fiber paper with a maximum 12.5mm (1/2") cell size.
- B. Doors: Shall be 25mm (1") thick with cover sheets not less than 22ga. (0.8mm). All doors are 1613mm (63.5") in length.
- C. Panels: Shall be 25mm (1") thick with cover sheets not less than 20ga. (0.8mm). All panels are 1613mm (63.5") in length. (Maximum partition depth 1550 mm (61").
- D. Pilasters: Shall be 32mm (1.25") thick with cover sheets not less than 18ga. (1.2mm).
- E. Hardware and Fittings: All panel and pilaster brackets and all door hardware shall be stainless steel. Fasteners are 12 x 1-3/4 and 12 x 5/8 TR-27 6-lobe security screws. Doors shall be equipped with a gravity type hinge mounted on the lower pilaster hinge

bracket. Door hinges shall be wrap-around style and adjustable to permit the door to rest at any position when not latched. Each door to be fitted with a combined coat hook and bumper and a concealed latch, with face mortised flush with edge strip of door. Barrier-free doors shall include thumbturn lever to activate latch without fingertip grip application. Both standard and barrier-free latches shall have a turn slot designed to allow emergency access from exterior. The combined full length extruded aluminum door stop and keeper shall have a 1/4" wide continuous rubber bumper locked in place the length of the stop. To cover the sightline gap at door hinge side, full length extruded aluminum filler channel shall be provided. The "no sightline" continuous stop and hinge filler shall be # 4 brushed to match the door and pilaster finish. Threaded door top hinge pin shall have a metal core and self lubricating nylon sleeve to ensure smooth, quiet operation. Pilaster shoes shall be a welded one-piece design made from polished stainless steel. Two-piece shoes that can disassemble when kicked are unacceptable.

## 2.3 FABRICATION

### A. Minimum Acceptable Metal Gauges:

1. Face Sheets for Panels, Screens, Doors and Pilasters: 20 gauge stainless steel.
2. Edge Moldings: 18 gauge stainless steel.
3. Concealed Reinforcement
  - a. For Tapping: 14 gauge galvanized steel.
  - b. For Anchoring Devices: 12 gauge galvanized steel.

### B. Thickness

1. Panels, Screens and Doors: 1" overall thickness.
2. Pilasters: 1-1/4" overall thickness.

### C. Sizes: As shown on drawings. Pilasters for compartments shall all be of the same width, except end pilasters which shall be approx. 1/2 the normal width.

### D. Construction

1. Panels, screens, doors and pilasters shall have face sheets, with formed edges, pressure cemented to each side of core insulation, providing flat, smooth surface, free of waves, warping, buckles or other defects.
2. Lock edges of face sheets together by either concealed tack welding face sheets at contacting edges at 8" o.c., and installing interlocking edge molding, or by using a combination integral edge molding and internal reinforcing channel epoxy bonded to face sheets.
3. Edge molding shall have corners mitered, welded or brazed, ground flush and finished to match adjacent surfaces. Corners, caps or exposed welds not permitted.

4. Provide concealed reinforcement for hardware, grab bars, fastenings and accessories specified for in both work of this Section and in work of other Sections (such as Toilet Accessories), and for rigidity, strength and support of units in accordance with requirements for type and use of metal toilet partition. Cut partitions in shop to receive toilet accessories, using templates furnished by Section 102813.
- E. Compartment Sizes: Unless otherwise indicated, minimum dimensions of components for toilet compartments shall be as follows:
1. Enclosure height - 5'-10".
  2. Typical door width - 2'-0".
  3. Door width for barrier free compartments - 2'-10".
  4. Door height - 4'-0".
  5. Floor clearance - 1'-0".

## 2.4 FINISHES

- A. Brushed finish.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where floor mounted toilet partitions are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

- A. Install work of this Section in a rigid and permanent manner, straight and plumb, with all horizontal lines level.
- B. Install panels and doors twelve (12) inches above finished floor, unless otherwise indicated. Toilet compartment doors shall be centered on water closets, unless otherwise indicated.
- C. Maintain uniform clearance of approximately 1/2" between pilasters and panels, and 1/2" between pilasters or panels and finished wall.
- D. Maintain uniform clearance of 1/4" or less between vertical edges of doors and pilasters.
- E. Set pilaster units with anchorages having not less than two (2) inches penetration into structural floor. Level, plumb, and tighten installation with devices furnished. Hang

doors and adjust so that tops of doors are level with tops of pilasters when doors are in closed position.

END OF SECTION

## SECTION 102213

### WIRE MESH PARTITIONS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the wire mesh partitions as shown on the drawings and/or specified herein.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Concrete - Section 033000.
- F. Masonry - Section 042000.

##### 1.4 QUALITY ASSURANCE

- A. Provide products of the standard best quality for the particular kind of material specified.

##### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's latest published literature for approval. Obtain approval before materials are delivered to the job site.
- B. Submit installation shop drawings for locations as indicated on the contract drawings. Shop drawings shall indicate elevations, sections, methods of anchoring and connecting to surrounding construction.

##### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Avoid damage to items during transit and delivery. Do not set work damaged in transit; replace with undamaged material without additional cost to the Owner.

- B. A space at the building shall be designated for the storage of material provided under this Section. The responsibility for all such material shall, however, rest entirely with the Contractor until it has been set and accepted as complete in accordance with the Contract requirements.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### A. Wire Mesh Partitions

1. Mesh: 1-1/2" diamond-intermediate crimped.
2. Wire: No. 10 W & M gauge.
3. Vertical Channel: 1-1/4" x 5/8" "C" Type with 1/4" bolts.
4. Horizontal Channel: 1" x 1/2".
5. Center Reinforcement: Double: Two 1" x 1/2" CCR channel bolted each side of mesh.
6. Corner Post: 1-3/4" x 1-3/4" x 1/8" angle.
7. Top Reinforcement: 2-1/4" x 1" Channel: Fastened with 1/4" "U" bolts. Approximately 24" on center.
8. Floor Sockets: 1-1/4" x 1-1/4" x 2-1/2" high-ductile iron (weldable).
9. Sliding Door Frame: 1-1/2" x 3/4" channel.
10. Swinging Door Frame: 1-1/4" x 1/2" channel.
11. Hardware: Mortise type lock operated by key outside, recess knob inside. Spring catches on pass windows.

#### B. Finish

1. Fabricated units shall be dipped in a cleaning bath.
2. Units shall be polyester powder coated and air dried.
3. Color shall be as selected by the Architect from manufacturer's standard colors.

- C. Bracing: Free standing partitions shall have 3" channel line posts approximately 15'-0" on center with 9" x 18" x 5/16" base plates.

### 2.2 MANUFACTURER

- A. Wire mesh partitions of height and layout as shown on the Drawings shall be:

1. Miller Wire Works, Inc.: No. 100M Standard All Wire Partition.

2. Acorn Wire and Iron Works, Inc.: No. 130 All Wire Type.
3. The G/S Co.: SureGuard.

### PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine the areas and conditions where wire mesh partitions are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 INSTALLATION

- A. All work is to be executed by skilled mechanics and shall be of the finest quality, neat in appearance and free from defects.
- B. Installation shall be made in strict accordance with manufacturer's recommendations, plumb, and true to line and level. Anchor partitions firmly to floor and adjacent masonry walls.

#### 3.3 ADJUST AND CLEAN

- A. Clean and leave free from blemishes, defects and dirt.
- B. Replace any damaged units at no change in Contract Price.
- C. Adjust hardware for maximum efficiency.

END OF SECTION

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## SECTION 102813

### TOILET ACCESSORIES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the toilet accessories as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Soap dispensers.
  - 2. Electric hand dryers.
  - 3. Toilet tissue dispenser.
  - 4. Mirrors.
  - 5. Grab bars.
  - 6. Robe hooks.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Gypsum board partitions - Section 092116.
- F. Ceramic tiling - Section 093013.
- G. Toilet partitions - Section 102113.
- H. Electrical - Division 26.

#### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- C. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units. Accessories shall be installed at heights that comply with the prevailing Handicapped Code.
- D. Products: Unless otherwise noted, provide products of same manufacturer for each type of unit and for units exposed in same areas.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

#### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  - 2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  - 4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).

5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.

- B. Product Data: Submit manufacturer's technical data, catalogue cuts and installation instructions for each toilet accessory.
- C. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work.
- D. Submit schedule of accessories indicating quantity and location of each item.

#### 1.6 PRODUCT HANDLING

- A. Deliver accessories to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name. Delivered materials shall be identical to approved samples.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge minimum, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Galvanized Steel Sheet: ASTM A 653, G60.
- D. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- E. Mirrors: ASTM C 1503, mirror glazing quality, clear glass mirrors, nominal 1/4" thick.

#### 2.2 FASTENING DEVICES

- A. Exposed Fasteners: Theftproof type, chrome plated, or stainless steel; match finishes on which they are being used.
- B. Concealed Fasteners: Galvanized (ASTM A 123) or cadmium plated.
- C. No exposed fastening devices permitted on exposed frames.
- D. For metal stud drywall partitions, provide ten (10) gauge galvanized sheet concealed anchor plates for securing surface mounted accessories.

#### 2.3 FABRICATION

- A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable. Where

locks are required for a particular type of toilet accessory, provide same keying throughout project. Furnish two keys for each lock.

- B. Surface-Mounted Toilet Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage.
- C. Recessed Toilet Accessories, General: Fabricate units of all welded construction, without mitered corners. Hang doors of access panels with full-length stainless steel piano hinge. Provide anchorage which is fully concealed when unit is closed.

## 2.4 MANUFACTURERS

- A. Provide products manufactured by Bobrick Washroom Equipment Co., Kimberley Clark, Toto, American Specialties, Inc., Bradley Corp., or approved equal.

## 2.5 ACCESSORY SCHEDULE

- A. PF-HD1: Hand dryer: Bobrick B-7128 Trimline Series, wall mounted, stainless steel w/ plastic trim, or approved equal.
- B. PF-M1: Mirror: Bobrick, B-209 1836, wall mounted, satin finish stainless steel, or approved equal.
- C. PF-G1: Grab bar: Bobrick, B-6806x42, wall mounted, satin finish stainless steel, or approved equal.
- D. PF-G2: Grab bar: Bobrick, B-6806x36, wall mounted, satin finish stainless steel, or approved equal.
- E. PF-H1: Robe hook: Bobrick, B-76717, satin finish stainless steel, or approved equal.
- F. PF-WR-1: Waste receptacle: Bobrick, B-2260, floor standing open top waste receptacle, satin finish stainless steel, or approved equal.
- G. PF-BC-1: baby changing station: Koala Kare, KB110-SSWM, wall mounted, satin finish stainless steel, or approved equal.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where toilet accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 PREPARATION

- A. Accessories which are to be partition mounted shall be closely coordinated with other trades, so that the necessary reinforcing is provided to receive the accessories.

- B. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum drywall and masonry partitions. Coordinate the work to assure that base plates and anchoring frames are in the proper position to secure the accessories.
- C. Verify by measurements taken at the job site those dimensions affecting the work. Bring field dimensions which are at variance with those on the approved shop drawings to the attention of the Commissioner. Obtain decision regarding corrective measures before the start of fabrication of items affected.
- D. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

### 3.3 INSTALLATION

- A. Install accessories at locations indicated on the drawings, using skilled mechanics, in a plumb, level and secure manner.
- B. Concealed anchor assemblies for gypsum drywall partitions shall be securely anchored to metal studs to accommodate accessories. Assemblies shall consist of plates and/or angles tack welded to studs.
- C. Secure accessories in place, at their designated locations by means of theftproof concealed set screws, so as to render removing of the accessory with a screwdriver impossible.
- D. Unless otherwise indicated, accessories shall conform to heights from the finished floor as shown on the drawings. Where locations are not indicated, such locations shall be as directed by the Commissioner.
- E. Installed accessories shall operate quietly and smoothly for use intended. Doors and operating hardware shall function without binding or unnecessary friction. Dispenser type accessories shall be keyed alike. Prior to final acceptance, master key and one duplicate key shall be given to City of New York's authorized agent.
- F. The Commissioner shall be the sole judge of workmanship. Workmanship shall be of the highest quality. Open joints, weld marks, poor connections, etc., will not be permitted. The Commissioner has the right to reject any accessory if he feels the workmanship is below the standards of this project.
- G. Grab bars shall be installed so that they can support a three hundred (300) lb. load for five minutes per ASTM F 446.

### 3.4 CLEANING AND PROTECTION

- A. Upon completion of the installation, clean accessories of dirt, paint and foreign matter.
- B. During the installation of accessories and until finally installed and accepted, protect accessories with gummed canvas or other means in order to maintain the accessories in acceptable condition.

- C. Replace and/or repair installed work which is damaged or defective to the City of New York's satisfaction, at no additional cost.

END OF SECTION

## SECTION 104416

### FIRE EXTINGUISHERS AND CABINETS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the fire extinguishers and cabinets as shown on the drawings and/or specified herein.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Gypsum drywall - Section 092116.
- F. Fire suppression systems - Division 22.
- G. Fire hose cabinets and valve cabinets - Division 22.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Provide portable fire extinguishers, cabinets and accessories by one manufacturer.
- C. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

## 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
  2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style and materials. Where color selections by Commissioner are required, include color charts showing full range of manufacturer's standard colors and designs available.
- C. Samples: Submit samples, 6" square, of each required finish. Prepare samples on metal of same gauge as metal to be used in the work. Where normal color variations are to be expected, include 2 or more units in each sample showing the limits of such variations.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following:
1. J. L. Industries.
  2. Larsen's Mfg. Co.

3. Potter Roemer.

2.2 EXTINGUISHERS

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Commissioner from manufacturer's standard which comply with requirements of governing authorities.
- B. Abbreviations indicated below to identify extinguisher type related to UL classification and rating system and not necessarily to type and amount of extinguishing material contained in extinguisher.
- C. Multi-Purpose Dry Chemical Type: UL rated 2A-10B:C, 5 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

2.3 MOUNTING BRACKETS

- A. Provide manufacturer's standard bracket designed to prevent accidental dislodgment of extinguisher, of proper size for type and capacity of extinguisher specified, in manufacturer's standard enamel finish; color to match extinguisher.

2.4 CABINETS

- A. Type and Style: Fire extinguisher cabinets shall be metal, recessed, with plexiglass panel, sized to fit within the partition or wall depth. Provide fire rated cabinets within fire rated partitions.
- B. Color: Fire extinguisher cabinets shall be factory pre-finished with baked enamel in the colors specified by the Commissioner. Design is based on "Model G-2409-R1" of Larsen's Mfg. Co. Other manufacturers noted herein may substitute their equivalent cabinet upon acceptance by the Commissioner.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where fire extinguishers and cabinets are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install items included in this Section in locations indicated and at heights to comply with applicable regulations of governing authorities.
  - 1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
  - 2. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

- B. Where exact location of cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by the Commissioner.

### 3.3 IDENTIFICATION

- A. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" painted on door by silk-screen process. Provide lettering on door as selected by Commissioner from manufacturer's standard letter sizes, styles, colors and layouts.
- B. Identify bracket-mounted extinguishers with red letter decals spelling 'FIRE EXTINGUISHER' applied to wall surface. Letter size, style and location as selected by the Commissioner.

### 3.4 SERVICE

- A. Determine the approximate completion date of the work and then inspect, charge, and tag the fire extinguishers at a date not more than 10 days before or not less than one day before actual completion date of the work.

END OF SECTION

## SECTION 113100

### APPLIANCES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the appliances as shown on the drawings and/or specified herein.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Sinks and related plumbing fixtures – Division 22.
- F. Electrical service – Division 26.

##### 1.4 SUBMITTALS

- A. Submit catalog cuts, product information and technical data for each appliance.

##### 1.5 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

##### 1.6 DELIVERY AND STORAGE

- A. Deliver products to project site in manufacturer's undamaged protective containers.
- B. Delay delivery until spaces to receive them have been fully enclosed and utility rough ins are complete.

## PART 2 PRODUCTS

### 2.1 APPLIANCES

#### A. General

1. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
2. Provide appliance and installations that are ADA compliant.

B. Refrigerator: GE Side-by-Side Refrigerator with Dispenser, GSHS6NGBSS (stainless steel), or approved equal.

C. Microwave Oven: GE ZEM200SF (stainless steel), or approved equal.

## PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where appliances are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with the original design, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Commissioner, anchoring all components firmly into position for long life under hard use.

C. Upon completion of installation and hookup to utilities, put each operating component of each appliance through at least five (5) complete operating cycles, adjusting as needed to secure optimum operation level.

D. Touch up scratches and abrasions to be completely invisible to the unaided eye from a distance of five (5) feet.

E. Promptly remove from the job site all cartons and packing material associated with the work of this Section.

END OF SECTION

## SECTION 122413

### WINDOW SHADES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the window shades as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Manually operated window shades.
  - 2. Field measurements of as-built conditions.
  - 3. Accessories and hardware required for complete installation and operation.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Provide assemblies which are complete assemblies produced by one manufacturer, including hardware, accessory items, mounting brackets, and fastenings.
- C. Provide materials in colors as selected by the Commissioner from manufacturer's standard colors.

## 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 018113 -1.5; Article C-1 (LEED BUILDING Submittal Requirements) of these specifications.
  2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
- C. Shop Drawings: Submit floor layout and elevations, indicating location of all window treatments, mechanism details, type and size of each unit, type and location of controls. Shop drawings must also show seaming of shade fabric. Submit shop drawings showing details of installation and relation to adjoining construction and conditions.
- D. Samples: Submit full size sample of each shade type for Commissioner's acceptance.
- E. Mock-Up
1. Install each type of shade assembly on one complete column bay for Commissioner's acceptance of installation details, workmanship and operation.
  2. Approved mock-up shall be used as the standard for installation of work under this Section, and no further installation work shall proceed before Commissioner's acceptance of the mock-up.

## 1.6 WARRANTY

- A. Manufacturer's standard non-depreciating 25-year limited warranty covering all hardware, chains, and shade cloth.

## 1.7 DELIVERY, STORAGE AND HANDLING

- A. Protect shades from damage, soiling and deterioration during transit, storage and handling to, until the City of New York's acceptance.

## PART 2 PRODUCTS

### 2.1 MANUALLY OPERATED SHADES

- A. Provide manually operated shade system equal to "MechoShade/5 System," made by the MechoShade Corp. or equal made by Sol-R-Veil Inc., Draper, or approved equal conforming to standards specified herein.
- B. Shade system shall be pre-engineered overrunning clutch design that disengages to 90% during the raising and lowering of the shade. The brake can stand a pull force of 40 lb. in the stop position. Requires no adjustment. Self-lubricating hub on to which the brake system is mounted includes an articulated brake assembly which assures smooth, non-jerky operation in raising and lowering the shades. System shall include the following components:
  - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
  - 2. Provide shade hardware that allows for removal and remounting of the shade bands without having to remove the shade tube, drive, or operating support brackets.
  - 3. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
  - 4. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
  - 5. Provide shade hardware system that allow for operation of multiple shade bands (multi-banded shades) by a single chain operator. Connectors shall be offset to assure alignment from the first to the last shade band. Chain shall be on right.
  - 6. Provide shade hardware constructed of minimum 1/8" thick plated steel or heavier as required to support 150% of the full weight of each shade.
  - 7. Drive Bracket / Brake Assembly:
    - a. Mecho Shade Drive Bracket M5 or equal by other manufacturers noted herein.
    - b. Drive Chain: #10 qualified stainless steel chain rated to 90 lb.
    - c. Drive Chain Location: Right.
    - d. Minimum Breaking Strength: Nickel plate chain shall not be accepted.

- C. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
  - 1. Hem Pockets and Hem Weights: Fabric hem pocket with RF welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be the same, for all shades within one room.
  - 2. Shade Band and Shade Roller Attachment:
    - a. Provide extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without deflection. Provide for positive mechanical engagement with drive/brake mechanism.
    - b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable/replaceable with a snap-on/snap-off spline mounting without having to remove shade roller from shade brackets.
    - c. Mounting spline shall not require use of adhesives, adhesive tapes, staples and/or rivets.

D. Valence: White.

## 2.2 SHADE CLOTH

- A. Shade cloth shall be "ThermoVeil," Translucent Vertical Weave 0900 Series, color 0903 Grey, openness factor +/-0-1%; made by MechoShade or equal by other manufacturers noted herein.

## 2.3 FABRICATION

- A. The shade and the fabric shall hang flat without buckling or distortion. The edge, when trimmed, shall hang straight without curling or raveling. An unguided roller shade cloth shall roll true and straight, without shifting sideways more than +/- 1/8" in either direction due to warp distortion or weave design. Shades shall fill window openings from head to sill and jamb to jamb.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where window treatments are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION: GENERAL

- A. Coordinate with the work of other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

- B. Install the work of this Section in strict accordance with the indicated design and the installation recommendations of the manufacturer as approved by the Commissioner.
- C. Upon completion of the installation, put all components through at least ten (10) complete cycles of operation, adjusting as necessary to achieve optimum operation.

### 3.3 INSTALLATION OF MANUAL ROLLER SHADES

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions and located so shade band is not closer than 2" to interior face of glass. Allow proper clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturers written instructions.

### 3.4 PROTECTION AND CLEANING

- A. Protect installed units to ensure proper operating condition, without damage or blemishes. Repair or replace damaged units as directed by the Commissioner.

END OF SECTION

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## SECTION 124813

### FLOOR MATS AND FRAMES

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the floor mats and frames as shown on the drawings and/or specified herein.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017479.
- D. Construction IAQ requirements – Section 018119.
- E. Concrete recess – Refer to structural drawings.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.
- B. Manufacturer: Except as otherwise indicated, provide entrance mats and accessories by a single manufacturer for entire project.

##### 1.5 SUBMITTALS

- A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:
  - 1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.

2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
  4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
  5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.
- B. Product Data: Submit manufacturer's specifications and installation instructions for entrance mat. Include methods of installation for each type of substrate.
- C. Samples: Submit samples for each type and color of exposed entrance mat, frames and accessories required. Provide 12" square samples of mat materials and 12" lengths of frame members.
- D. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining and rehandling of removable entrance mat units.

#### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

### PART 2 PRODUCTS

#### 2.1 MAT AND FRAME

- A. Mat: Provide 3/8" thick vinyl-backed Decorib / Tough Rib entrance mat in one piece, by Mats Inc., or equal by US Mat & Rubber Corp., Musson Rubber Co., or approved equal.
1. Color: Grey #51.
  2. Mats shall meet DOC Flammability Spec. (DOC-1-FF1-70) and shall not generate static electricity. Mats shall be natural fibers fused into a vinyl backing, classified as a "B" rating under Test ASTM E 84.

B. Frame

1. Framing members for recessed mats shall be angle type of extruded aluminum, ASTM B 221, Alloy 6061-T6, with a clear anodized finish.
2. Framing members shall be shop fabricated as an assembled unit and shall be provided with hairline joints, equally spaced, complete with corner pin, splice plates and installation anchors.
3. Surfaces in contact with concrete shall have a shop coating of clear acrylic.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where floor mats and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Install angle mat frames into prepared block out. Install mat frames in accordance with the manufacturer's installation instructions. Locate, align and level frame members accurately.
- B. Protection: Upon completion of frame installation and concrete work, provide temporary filler of plywood or fiberboard in mat recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and project reaches substantial completion.
- C. Delay installation of mats until work on the project reaches substantial completion.
- D. Lay mats in frames to fit properly and be centered in the recess; do not adhere.

END OF SECTION

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## SECTION 142423

### HYDRAULIC PASSENGER ELEVATOR

#### PART 1 - GENERAL

##### 1.1 SUMMARY

These specifications are intended to cover the complete installation of one (1) cantilevered roped holeless hydraulic elevator designated "PE-1".

##### 1.2 RELATED WORK

- A. A mainline fused disconnect switch shall be provided for the elevator. The mainline disconnect switch shall be located approximately 18" from the strike side of the machine room door and 52" above the floor. Provide an auxiliary contact for battery lowering device.
- B. 110 Volt circuit breaker panel with lockout capabilities.
- C. Machine room lighting with the light switch located directly adjacent to the strike jamb and two (2) 20 AMP G.F.I. outlets.
- D. A phone line circuit in the machine room for emergency communications (24 hour emergency communications to an accessible location must be provided.).
- E. Adequate mechanical ventilation of machine room and/or machinery space to maintain temperature between 55°F and 90°F. and not to exceed 85% relative humidity.
- F. Provisions for natural ventilation directly to the outside air.
- G. A weather resistant type lighting fixture and G.F.I. outlet in the elevator pit. (The bulb must be protected by a grounded metal guard or lexan cover.) The switch shall be located adjacent to the strike side of the pit access door. Final locations of light, outlet and switch to be field coordinated in accordance with the elevator layout drawings.
- H. Smoke detectors as required in the elevator lobbies, machine room and hoistway including wiring and activation signals brought to the elevator machine room terminating in a junction box located adjacent to the elevator controller.
- I. Enclosed and protected machine room and/or machinery space. Minimum machine room height shall be 8' - 0".
- J. Access to machine room and/or machinery space to be a minimum of 3' - 6' wide by 6' - 8' high and shall be self-closing and locking. The lock shall be non-canceling and operate from within the room without the use of a key.
- K. Clear hoistway plumb from top to bottom with variations not to exceed one 1" at any point in the first 100 feet. Tolerance may increase at 1/32" for each additional ten (10) feet up to a maximum displacement of 2".

- L. Beveled guards are required for projections, recesses and setbacks in the hoistway that project more than 2" inside the general line of the hoistway on sides not used for loading or unloading.
- M. Hoistway protection in case of fire. (Two (2) hour rated enclosure or as required by local building codes.)
- N. Supports for guide rail fastenings at each floor and/or intermediate supports. Provisions for bracket spacing should not exceed 10' - 0".
- O. Recesses, fireproofing and patching, as required, to accommodate hall button boxes, signal fixtures, hoistway entrance frames, etc.
- P. Vertical, noncombustible ladder for the elevator extending 42" above the sill of the access door where the pit extends more than 36" below the sill of the access door.
- Q. Dry pit including sump pit, pump or drains. Drains connected directly to sewers shall not be installed. Provide covers over sump pits or drains. Provide pump with oil minder switch and associated accessories.
- R. Pit reinforced to sustain vertical forces from guide rails, buffers and cylinders.
- S. Entrance walls for elevator are not to be constructed until door frames and sills are in place.
- T. Furnishing, installing and maintaining the required fire rating of elevator hoistway walls, including the penetration of fire wall by elevator fixture boxes.
- U. The interface of the elevator wall with the hoistway entrance assembly shall be in strict compliance with the elevator supplier's/contractors supplier's requirements.
- V. Door frames are to be anchored to walls and properly grouted in place if installed in masonry walls to maintain fire ratings. The head jamb of the entrance frames shall not be used to support the weight of the wall over the frame.
- W. Support for sills the full width of hoistway, with 2 1/2" minimum recesses including grouting after sills are set in place.
- X. Stainless steel governor access door (24" x 24") at top of shaft as shown on the drawings with contact. Provide a steel access ladder.
- Y. Provide sill support angles.
- Z. Refer to the drawings for additional related work items.

Refer to all Contract Documents for additional construction details. All Related Work must be coordinated by the Elevator Contractor.

### 1.3 QUALITY ASSURANCE

- A. The Elevator Contractor shall be an established firm of at least three (3) years in existence. Submit proof of compliance of this requirement with the bid proposal.
- B. The approved hydraulic elevator companies and component manufacturers are:
  - 1. Canton Elevator, Inc.
  - 2. CEMCO Elevator Products
  - 3. Otis Elevator Company
  - 4. Schindler Elevator Company
  - 5. Thyssen Elevator Company
- C. Additional approved equipment manufacturers:
  - 1. Controller - MCE, G.A.L., ESI
  - 2. Fixtures - EPCO, G.A.L., Monitor, National
  - 3. Door Protective Device – G.A.L., Janus, Tri-Tronics
  - 4. Cabs and Entrances – CEC, EDI/ECI, National Cab & Door
  - 5. Approved Equals

### 1.4 STANDARDS

Except as modified by governing codes and by this Division, the work shall comply with provisions of the latest editions of the following, and in the event of conflict between these standards, the Commissioner's determination shall be final:

- A. ASME A17.1: The American Society of Mechanical Engineers - Safety Code for Elevators and Escalators including Supplements as adopted by the New York City Department of Buildings, Elevator Division.
- B. ANSI A117.1: American National Standards for Buildings and Facilities Providing Accessibility and Usability for Physically Handicapped People.
- C. ADA: Americans with Disabilities Act.
- D. Building Code of the City of New York.

## 1.5 SUBMISSION, SAMPLES, CUTS AND DRAWINGS

- A. The Shop Drawings shall show material type and gauge, general dimensions, methods of attachment, location and size of reinforcements and openings, and a general arrangement of components. Approval thereof shall not relieve the Contractor of compliance with the specification, unless the attention of the Commissioner is called to the non-complying features in writing. Shop drawings shall be reflective of all Contract Documents.

The Drawings submitted shall be as follows:

1. Elevator section showing overhead, pit and floor to floor dimensions. The drawing shall be scaled and shall show all structure and beam locations and details. Details shall include the height of the cab, door operator and crosshead, including details of rope shackle.
2. Hoistway plan shall clearly show all typical dimensions to scale. In addition, plan shall identify all structural beam and divider beam locations and sizes; widths and depth of beams as they relate to the clear hoistway and hoistway walls; column pads in the pit and all column intrusions into the shaft. Provide large scale drawings and details of sill support condition and column encroachments.
3. Provide machine room plan showing all typical dimensions and equipment layout. Show clearly all electrical disconnects or switchgear in the code compliant location and to scale.
4. Provide large scale drawings for the car enclosure showing cab plan, reflective ceiling, wall elevations, front returns and car station integration. Detail section through wall panel from canopy to platform. Detail section through suspended ceiling including attachment to canopy. Detail typical joints, reveals and panel edging, panel attachments, handrail fastening and pad button attachment to shell. Include all gauges of steel components. Provide thickness and type of materials used for wall panels and ceiling along with lamination details.
5. Entrance details with the same specifics and quality of information provided for the cab details.
6. Provide fixture drawings job specific in large scale. Identify all engraving including font, depth of engravings and infill color material. (No applied or recessed plates shall be acceptable except for Braille plates.) Provide gauges of all material used. Provide faceplate fastener and hinging method and type.
7. Provide cut section through emergency light, position indicator, intercom/auto-dial telephone, buttons, Braille plates and service cabinet. (If requested)
8. Car frame and car platform construction details and layout complete. (If requested)
9. Machine isolation foundation fastening details and hydraulic oil line isolation fastening details (as applicable). Include manufacturer's data of all isolation equipment used.

B. Sample submissions shall include:

1. Cab or fixture material and finishes.
2. Braille plates and jamb designation.
3. Push-buttons, position indicators, emergency lighting fixture.

C. Sixty (60) days prior to the completion of the work of the contract, the Contractor shall submit to the Construction Manager six (6) copies of an Operation Maintenance and Parts Manual and six (6) complete sets of as-built. These shall be reviewed, and if approved, shall become the property of the Commissioner.

1.6 PERMITS

A. The Contractor shall file all necessary plans and application with the local building department or other authorities having jurisdiction and obtain the required permits and approvals.

B. The Contractor shall submit to the Construction Manager/General Contractor a copy of the permit application, elevator specs, permit and print of elevator drawings as submitted and approved by the authority having jurisdiction.

C. Upon completion of the work, and prior to final payments, tests may be made by the Commissioner of all materials and appliances installed hereunder. The Contractor shall furnish all labor and materials required for such tests.

1. Should the tests show that any of the materials, appliances or workmanship are not first class or not in compliance with the Specifications, the Contractor, on written notice from the Commissioner, shall remove same and promptly replace them with other materials and appliances in conformity with the Specifications.

D. The Contractor shall perform all tests required by the authorities having jurisdiction in the presence of an authorized inspector to obtain Final Certificate of Inspection prior to turnover of the elevator to the Commissioner.

1.7 PROTECTION

A. Protect all items against dirt and damage. The Contractor shall be held fully responsible for all damage until final acceptance. Any equipment or property of the Commissioner damaged by this Contractor or his employee's, shall be restored to its original condition or replaced without cost to the Commissioner.

1.8 WARRANTY

A. The elevator contractor shall guarantee the materials and workmanship of the apparatus furnished under these specifications and shall make good any defects which may develop within one (1) year from the date of final acceptance of the elevator.

## 1.9 MAINTENANCE

- A. Furnish full protective maintenance on the equipment described herein for a period of one (1) year from the date of final acceptance of the entire installation. The maintenance shall include systematic monthly examinations, adjustments and lubrication of all equipment. Also repair or replace any parts of equipment whenever this is required during the maintenance period and shall use only genuine standard parts produced by the manufacturer of the equipment installed.
- B. All work under the maintenance provisions shall be performed by competent personnel under the supervision and in the direct employ of the Contractor and 24-hour emergency call back service shall be available at all times and be included in the cost of the contract. Maximum response time for an entrapment shall not exceed 30 minutes and shall not exceed 2 hours for non-emergency shutdowns.
- C. Full protective maintenance requirements:
  - 1. Regularly and systematically examine, adjust, lubricate, clean and when conditions warrant repair or replace the following items and all other mechanical or electrical equipment.
  - 2. Hydraulic power unit and accessories: pump, motor, valves, operating valves, pulleys, drive belts, flexible hydraulic hose and fitting assemblies, oil tank, muffler, strainer, sound isolating coupling, plunger, packing gland, scavenger system, piping and other components.
  - 3. Controller, Selector and Dispatching Equipment: all components including all relays, solid state components, resistors, condensers, transformers, contacts, leads, dashpots, computer devices, selector switches, mechanical or electrical driving equipment, coils, magnet frames, contact switch assemblies, springs, solenoids, resistance grids, hoistway vanes, magnets and inductors.
  - 4. Hoistway door interlocks or locks and contacts, hoistway door hangers and tracks, bottom door gibs, cams, rollers, and auxiliary door closing devices for power operated doors. Chains, tracks, cams, interlocks, sheaves for vertical bi-folding doors.
  - 5. Hoistway limit switches, slowdown switches, leveling switches and associated cams, vanes, and electronic components.
  - 6. Guide shoes including rollers or replaceable gibs.
  - 7. Automatic power operated door operators, door protective devices, car door hangers, tracks and car door contacts for both side slide and vertical bi-folding doors.
  - 8. Traveling cables.
  - 9. Elevator control wiring in hoistway and machine room.
  - 10. Car safety mechanism and load weighing equipment.
  - 11. Buffers.
  - 12. Fixture contacts, push-buttons, key switches, locks, lamps and sockets of button stations (car and corridor), corridor lanterns, position indicators (car and corridor), direction indicators.

13. The guide rails shall be kept free of rust. Where roller guides are used, rails shall be kept dry and properly lubricated when sliding guides are used. Renew guide shoe rollers and gibs as required to insure smooth and satisfactory operation.
  14. Examine, and make necessary adjustments or repair to the following accessory equipment including relamping of signal equipment: corridor lanterns, car and corridor position indicators, car stations, traffic director station, electric door operators, interlocks, door hangers, safety edge, and intercom systems.
  15. Examine regularly and systematically all safety devices, and conduct an annual no load test, and each third year perform a full load, full speed test of safety mechanism and car buffers. The car balance shall be checked. All tests shall be performed in accordance with the provisions of the American National Standard, Safety Code for Elevators and Escalators (ANSI/ASME A17.1), current edition. Repair or replace conductor cables and hoistway and machine room elevator wiring.
  16. Maintain all elevator equipment in hoistways, machine rooms, and pits in a clean, orderly condition, free of dirt, dust and debris.
  17. Furnish lubricants compounded specifically for elevator usage.
  18. Contractor shall not be required to make renewals or repairs necessitated by reason of negligence or misuse of the equipment or by reason of any other cause beyond the contractor's control except ordinary wear and tear unless the Contractor receives just compensation.
  19. The Elevator Subcontractor shall not be responsible for the following items of elevator equipment: cab interior (including removable panels, door panels, car gates, plenum chambers, hung ceilings, light diffusers, light tubes and bulbs, handrails, mirrors and carpets): hoistway enclosure, hoistway door, frames and sills.
  20. Emergency calls and minor repairs shall be answered at all hours of the day or night. Minor repairs shall mean those repairs which can be remedied by replacing a spare component stored on-site as further specified. Major repairs and normal preventative maintenance work shall be performed during normal business hours. Should overtime work be required for repairs other than minor repair work, the Commissioner will pay the actual amount of the premium portion of the wage. The Contractor shall pay the basic hourly rate.
  21. The Contractor shall check the group dispatching systems (if applicable) and make necessary tests to insure that all circuits and time settings are properly adjusted, and that the system performs as designed and installed.
  22. Contractor shall perform the required mandated inspections and tests as required per local jurisdictions during the term of the included one (1) year maintenance contract.
- D. The Contractor shall keep the elevator maintained to operate at the original contract speed, keeping the original performance time, including acceleration and retardation as designed and installed by the manufacturer. The door operation shall be adjusted as required to maintain the original door opening and door closing times, within legal limits.

- E. The Commissioner reserves the right to make inspections and tests as and when deemed advisable. If it is found that the elevator and associated equipment are deficient either electrically or mechanically, the Contractor will be notified of these deficiencies in writing, and it shall be his responsibility to make the necessary corrections within 30 days after his receipt of such notice. In the event that the deficiencies have not been corrected within 30 days, the Commissioner may terminate the Contract and employ a Contractor to make the corrections at the original bidder's expense.
- F. Approximately six months prior to the end of the contract term, the Commissioner may make a thorough maintenance inspection of the elevator covered under the contract. At the conclusion of this inspection, the Commissioner may give the Contractor written notice of any deficiencies found. The Contractor shall be responsible for correction of these deficiencies within 30 days after receipt of such notice.
- G. The Commissioner reserves the right to accept or reject any or all alternates.

1.10 KEYS

- A. At the completion of all work, the Contractor shall furnish ten (10) sets of keys for each key device installed.

1.11 ASSIGNMENTS

- A. The Elevator Contract is not assignable as a whole or in part without the written consent of the Commissioner.

PART 2 - PRODUCTS

2.1 DESCRIPTION OF ELEVATOR SYSTEM

A. ELEVATOR "PE-1"

1. Quantity	One (1) Cantilevered Roped Holeless Hydraulic Passenger Elevator
2. Capacity	2,000 Pounds
3. Speed	100 FPM
4. Travel	48' - 6"
5. Number of Landings	Four (4) @ Cellar, 1, 2, 3
6. Number of Openings	Four (4) In Line
7. Operation	Simplex Selective Collective
8. Control	Microprocessor

9. Platform Size	6' - 0" Wide x 5' - 1" Deep
10. Buffers	Spring
11. Car Enclosures	As Specified Herein
12. Landing Doors	3' - 0" Wide x 7' - 0" High
13. Door Operation	Single Speed Side Opening
14. Machine Location	Adjacent @ Cellar
15. Communication Equipment	Auto-Dial Telephone (Car and Machine Room)
16. Power Supply	208 Volts, 3 Phase Provide an Auxiliary Contact (Verify Voltage)

## 2.2 POWER UNIT

- A. The power unit shall be compactly and neatly designed with all components combined in a self-contained unit and with all adjustment features accessible. It shall include (at a minimum) a constant displacement rotary screw-type, pump motor designed for oil hydraulic elevator service, oil reservoir (minimum 10-gallon reserve) with an oil-level indicator, control valve, tank strainer in the suction line, integral pressure gauge and blowout proof muffler to reduce pulsations that may occur in the system. The power unit shall be tested and adjusted at the factory by operating a test elevator loaded to conform to the elevator specified herein.
- B. The motor shall be designed for 120 starts per hour.

## 2.3 POWER UNIT ISOLATION

- A. The power unit shall be mounted on vibration sound dampeners designed to isolate the unit from the building structure. Sound and vibration isolation pads shall be installed between the motor/pump assembly and the power unit structure and between the power unit and the machine room floor.
  - 1. Provide neoprene vibration isolator pads.
  - 2. All wiring connections to the power unit shall be flexible conduit, minimum 36" long, and installed slack.

## 2.4 VALVES

- A. A control valve including safety check valve, up direction valve with high pressure relief including up leveling and soft stop features, lowering valve including down leveling and manual leveling feature shall be mounted in a compact unit assembly. Control valves shall be solenoid operated and designed to open and close gradually to give smooth control. All valves shall be readily accessible for adjustment. The valve shall be equipped with a "no pressure sensing device" which will disable the piston from dropping if the car is blocked for any reason.

## 2.5 AUTOMATIC TWO-WAY LEVELING

- A. An automatic two-way leveling device shall be provided so that the car will approach landing stops at reduced speed from either direction of travel. The leveling device shall, within its zone, be entirely independent of the operating device and shall automatically stop and maintain the car within 1/4" level with the landing, regardless of change in load.

## 2.6 JACK UNIT (CANTILEVERED ROPED HYDRAULIC)

- A. Design and construct the jack unit in accordance with the applicable requirements of the ASME Code. It shall be of sufficient size to lift the gross load at the rated speed to the height specified and shall be factory tested to ensure adequate strength and freedom from leakage. No brittle material, such as gray cast iron, shall be used in the jack construction.
- B. The jack unit shall consist of the following parts: a plunger of heavy seamless steel tubing accurately turned and polished; a stop ring electrically welded to the plunger to positively prevent the plunger leaving its cylinder; an internal babbitt-lined guide bearing, packing or seal of suitable design and quality, a drip ring around cylinder top and a cylinder made of steel pipe and provided with a pipe connection and air bleeder.
- C. Install jack unit plumb with heavy duty clamps to attached guide rail brackets and/or building structure and intervals not to exceed 7' - 0" or as recommended by the equipment supplier.

## 2.7 PACKING GLAND AND OIL RETRIEVAL SYSTEM

- A. A steel packing gland with phenolic guide bearing, wiper ring and packing especially designed for hydraulic elevator service shall be provided. An oil retrieval system shall be furnished to return oil leakage back to the storage tank.

## 2.8 PIPING

- A. All hydraulic piping outside the power unit shall be seamless Schedule 80 Pipe with threaded connections.

## 2.9 HYDRAULIC MUFFLER AND ISOLATION COUPLINGS

- A. A muffler shall be provided in the oil line near the power unit. The muffler shall be designed to reduce pulsation and noise which may be present in the flow of the hydraulic fluid.
  - 1. Provide sound isolation couplings in the oil line. The couplings shall incorporate neoprene seals and gaskets to limit the transmission of vibrations.
  - 2. When the hydraulic pipe penetrates a wall or slab, the gap shall be filled with properly sized isolation and sealed accordingly.

## 2.10 CONTROLLER AND OPERATION

- A. A generic non-proprietary microprocessor-based controller shall be provided including necessary starting switches together with all relays, switches, solid state components and hardware required for operation, including door operation, as described herein. Operational control shall be by microprocessor. A three-phase overload device shall be provided to protect the motor against overloading.
- B. The elevator shall not require the functioning or presence of the microprocessor to operate on car top inspection or hoistway access operation to provide a reliable means of moving the car if the microprocessor fails.
- C. A motor limit timer function shall be provided which, in case of the pump motor being energized longer than a predetermined time, shall cause the car to descend to the lowest landing and park, open the doors automatically and then close them. Car calls shall be canceled and the car taken out of service automatically. Operation may be restored by cycling the main line disconnect switch or putting the car on access or inspection operation. Door reopening devices shall remain operative.
- D. A valve limit timer shall be provided which shall automatically cut off current to the down valve solenoids if they have been energized longer than a predetermined time. The car calls shall then be canceled and the car taken out of service automatically. Operation may be restored by cycling the main line disconnect switch or putting the car on access or inspection operation. Door reopening devices shall remain operative.
- E. A selector switch shall be provided on the controller to select high or low speed during access or inspection operation as long as contract speed does not exceed 150 feet per minute.
- F. Viscosity control shall cause the car to accomplish the following operation. A temperature sensor shall be provided to determine if the oil is too cold, and if there are no calls registered, the car shall go to the bottom landing and, as long as the doors are closed, the pump motor shall run without the valve coils energized to circulate and heat the oil to the desired temperature. In the event that the temperature sensor fails, a timer shall prevent continuous running of the pump motor.
- G. The control system shall provide comprehensive means of accessing the computer memory for elevator diagnostic purposes. It shall have permanent indicators for important elevator statuses as an integral part of the controller.
- H. Failure of any single magnetically operated switch, contactor, or relay to release in the intended manner; the failure of any static control device, speed measuring circuit, or speed pattern generating circuit to operate as intended; the occurrence of a single accidental ground or short circuit; shall not permit the car to start or run if any hoistway door or gate interlock is unlocked or if any hoistway door or car door or gate contact is not in the made position. Furthermore, while on car top inspection or hoistway access operation, failure of any single magnetically operated switch, contactor or relay to release in the intended manner; the failure of any static control device to operate as intended; or the occurrence of a single accidental ground, shall not permit the car to move even with the hoistway door locks and car door contacts in the closed or made position.

- I. Dedicated permanent status indicators shall be provided on the controller to indicate when the safety string is open, when the door locks are open, when the elevator is operating at high speed, when the elevator is on independent service, when the elevator is on fire service, when the elevator out of service timer has elapsed, and when the elevator has failed to successfully complete its intended movement. In addition, a means shall be provided to display other special or error conditions that are detected by the microprocessor.
- J. An out of service timer shall be provided to take the car out of service if the car is delayed in leaving the landing while there are calls existing in the system.
- K. Door Protection Timers:
  - 1. Door protection timers shall be provided for both the opening and closing directions, which will protect the door motor and will help prevent the car from getting stuck at a landing. The door open protection timer shall cease attempting to open the door after a predetermined time in the event that the doors are prevented from reaching the open position. In the event that the door closing attempt fails to make up the door locks after a predetermined time, the door close protection timer shall reopen the doors for a short time. If, after a predetermined number of attempts, the doors cannot successfully be closed, the doors shall be opened and the car removed from service.
  - 2. A minimum of four different door standing open times shall be provided. A car call time value shall predominate when only a car call is canceled. A hall call time value shall predominate whenever a hall call is canceled. In the event of a door reopen caused by the safety edge, photo eye, etc., a separate short door time value shall predominate. A separate door standing open time shall be available for lobby return.
  - 3. If the doors are prevented from closing for longer than a predetermined time, door nudging operation shall cause the doors to move at slow speed in the closed direction. A buzzer shall sound during the nudging operation.
- L. Car and hall call registration and lamp acknowledgment shall be by means of a single wire per call, in addition to the ground and the power bus. Systems that register the call with one wire and light the call acknowledgment lamp with a separate wire, are not acceptable.
- M. Fire Phase I emergency recall operation and Phase II emergency in-car operation shall be provided according to applicable local codes.
- N. Independent service operation shall be provided in such a way that actuation of a key switch in the car operating panel will cancel any existing car calls, and hold the doors open at the landing. The car will then respond only to car calls. Car and hoistway doors will only close with constant pressure on a car call push-button or the door close button. While on independent service, hall arrival lanterns or jamb mounted arrival lanterns shall be inoperative.

- O. Simplex Selective Collective automatic operation shall be provided for the installations. Operation of one or more car or hall call push-buttons shall cause the car to start and run automatically, provided the hoistway door interlocks and car door contacts are closed. The car shall stop at the first car or hall call set for the direction of travel. Stops shall be made in the order in which car or hall calls set for the direction of travel are reached, regardless of the order in which they were registered. If only hall calls set for the opposite direction of travel of the elevator exist ahead of the car, the car shall proceed to the most distant hall call, reverse directions, and start collecting the calls.
- P. A relay panel inspection switch and an up/down switch shall be provided in the controller to place the elevator on inspection operation and allow the user to move the car in the hoistway. The car top inspection switch shall render the relay panel inspection switch inoperative.
- Q. A timer shall be provided to limit the amount of time a car is held at a floor due to a defective hall call or car call, including stuck push-buttons. Call demand at another floor shall cause the car, after a predetermined time, to ignore the defective call and continue to provide service in the building.
- R. The microprocessor boards shall be equipped with on-board diagnostics for ease of troubleshooting and field programmability of specific control variables. The field changes shall be stored permanently, using non-volatile memory. The microprocessor board shall provide the features below.
  - 1. On-board diagnostic switches and an alphanumeric display. These switches and displays shall provide user-friendly interaction between the mechanic and the controller.
  - 2. On-board real time clock. The real time clock shall display the time and date and is adjustable by means of on-board switches.
  - 3. Field programmability of specific timer values (i.e., door times)
- S. As an integral part of the controller, the capability shall be provided to attach on-site or remote computer peripherals, yielding additional adjustment or diagnostic capabilities.
- T. Hoistway Access Key Switch operation at the terminal landings are to gain access to the top of the car from the top landing and to gain access to the pit from the bottom landing.
- U. Provide a keyed floor lockout.

## 2.11 REDUCED CURRENT STARTING

- A. Reduced current starting shall be furnished which shall limit both the initial starting current and peak current drawn by the motor.
  - 1. Provide solid state reduced voltage starting systems.

## 2.12 LOW OIL CONTROL

- A. In the event of a low oil condition, a low oil control feature shall be provided designed to automatically cause an up traveling car to descend to the lowest terminal landing to permit passengers to egress. The doors shall then automatically close and all control buttons, except the "Door Open" button in the car operating panel, shall be made ineffective. The oil reservoir should be refilled before the elevator is returned to service. The low oil control may be utilized as part of the Automatic Lowering Feature as specified herein.

## 2.13 AUTOMATIC POWER FAILURE SAFETY SYSTEM

- A. Provide a battery powered Auto-Lowering System.

## 2.14 MAIN GUIDE RAILS

- A. Provide machine standard (15 lb./ft.), "T" section guide rails with tongue and grooved joints for the car's main rails. Use not less than 3/4" thick steel machined fishplates to form rail joints. Connect rails to fishplates with four (4) bolts. Brackets shall be used to support the rails from the hoistway framing, pre-cast concrete planks and/or inserts. Rails to be attached to the brackets with clips. Provide rail backing where no intermediate support framing is shown on the drawing. All guide rails shall be erected plumb and parallel to a maximum deviation of 1/8" (plus or minus 1/16").

- 1. Inserts (if used) shall be furnished by Elevator Contractor and installed by others. The Elevator Contractor shall provide the Construction Manager with clear insert location drawings (shaft plan and section).

## 2.15 AUXILIARY RAILS AND BRACKETS

- A. Provide manufacturers recommended "T" section rails and fishplates of adequate size for guiding the rams header sheave. Brackets shall be used to support the rails from the hoistway framing and/or inserts. Rails shall be attached at the brackets with clips. All rails to be erected plumb to and in complete alignment to the main rails and cylinder.

## 2.16 CAR SAFETY

- A. A car safety shall be provided for the roped hydraulic elevator. The safety shall be of the type which can be released only by moving the car in the "up" direction. To return a car to normal operation after a safety set, the car shall be moved hydraulically in the "up" direction. For repairs of an obvious or suspected malfunction, the car may be raised by other means capable of holding the entire car weight. Prior to releasing the other means, the car shall be run hydraulically in the "up" position.

## 2.17 SPEED GOVERNOR

- A. A car speed governor, conforming to the requirements of ASME A17.1, shall be provided to activate the car safety. Provide self-resetting governors if acceptable to the local jurisdiction. Provide a stainless steel access door with a contact and hardware.

## 2.18 HOIST AND GOVERNOR ROPES

- A. Provide hoist and governor ropes of proper quantity and size in accordance with ASME A17.1 code and manufacturers requirements.

## 2.19 CAR SLING

- A. The car frame shall be constructed of structural steel members designed specifically for roped hydraulic platform applications.
- B. Design the car frame for an 8' - 0" overall cab height, (7' - 6" clear cab).

## 2.20 PLATFORM

- A. The platform shall be steel construction mounted on manufacturer's standard vibration isolation pads. The sub-flooring is to be constructed of two (2) layers of 3/4" marine-grade plywood (finished flooring is by others). The underside of the platform shall be properly fireproofed with 26 gauge galvanized steel metal in a maximum of two (2) sections.
- B. Provide an extruded aluminum car sill.
- C. Recess the platform as required for the finish flooring.

## 2.21 CAR GUIDE SHOES

- A. The car frame shall have manufacturer's standard guide shoes attached at the upper and lower portion of the stiles. These roller-guide shoes shall be adjustable, spring loaded type with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car frame. Shoes shall be designed for cantilevered application.

## 2.22 BUFFERS

- A. Spring buffers shall be provided in the elevator pit. Means shall be provided for mounting buffers securely on channels at the pit floor.

## 2.23 HOISTWAY ENTRANCES

- A. Hoistway entrances of the hollow metal horizontal sliding, single speed type, shall be provided at each hoistway opening. Each entrance shall include 14 gauge steel unit frames (corners to be welded and ground smooth), flush design 16 gauge door panels, sight guards, extruded aluminum sills, strut angles, headers, hanger covers, fascia plates, toe guards, dust covers and necessary hardware.
- B. Material and Finish shall be as follows:
  - 1. Frames: Factory Baked Enamel Finish.
  - 2. Door Panels: Factory Baked Enamel Finish.
  - 3. Sight Guards: Factory Baked Enamel Finish.

- C. Fascias, hanger covers, toe guards and dust covers shall be a minimum of 16 gauge and have the manufacturer's standard enamel or galvanized finish. Structural members shall have prime coat finish.
  - 1. Header, Struts and strut extensions shall be a minimum of 10 gauge formed steel.
- D. Sills, struts, headers, hanger covers and unit frames shall be erected prior to the erection of rough walls and set in proper relation to the car guide rails. Door panels shall be installed after the walls are finished.
- E. Provide keyholes for each landing door in accordance with G.A.L. equipment requirements with stainless steel ferrule insert.
- F. Use sill mounted spring closers.
- G. Provide sill support angles.
- H. Provide a 24" x 24" exterior grade stainless steel governor access door with code compliant hardware and contact.

#### 2.24 MASTER DOOR OPERATOR

- A. A Master Door Operator with a ½ Hp direct current motor shall be provided to open and close the car and hoistway doors simultaneously, at a maximum speed of not less than 1 ½ feet per second. Door movement shall be cushioned or checked at both limits of travel. An electro-mechanical interlock shall be provided on each hoistway door to prevent the operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car door to prevent the operation of the elevator unless the car door is closed.
- B. The door operator shall be arranged so that, in case of interruption or failure of electric power from any cause, the doors can be readily operated by hand from within the car. Emergency devices and keys for operating the doors from the landing shall be provided unless otherwise specified by local codes.
- C. The doors shall open automatically when the car is leveling at the respective landings and shall close after a predetermined time interval or immediately upon pressing a car button. A "Door Open" button shall be provided in the car, the momentary pressing of which shall reopen the doors and reset the time.
- D. Set door dwell time to twenty (20) seconds.

## 2.25 DOOR EDGE PROTECTIVE DEVICE

- A. Provide an infra-red curtain type reopening device with proximity detector that will stop and reopen the car door and hoistway door automatically if the door becomes obstructed by an object or person. The device shall be capable of completing these operations without required contact for an obstruction passing through the opening. The device shall be a non-reflective through beam system with a minimum of forty sensors per edge. It shall have a maximum sensor spacing of 1.8" or less. It shall incorporate a microprocessor controlled fail-safe system. It shall be capable of self adjustment to compensate for varying environmental conditions. Provide Janus Pana 40 Plus 3D or approved proximity type device.

## 2.26 DOOR HANGERS AND TRACKS

- A. Hangers and tracks shall be provided at each car and hoistway entrance. Tracks shall be of bar steel with the working surface contoured to match the sheaves. The hangers shall be designed for power operation and have provisions for vertical and lateral adjustment. Hangers shall be designed for two point suspension of the door panel.
- B. Hanger sheaves shall be polyurethane with pre-lubricated and sealed-for-life bearings. Car door hangers shall have 3 1/4" diameter sheaves. Hoistway door hangers shall have 3 1/4" diameter sheaves.

## 2.27 INSPECTOR'S OPERATING STATION

- A. An inspector's operating station shall be provided on top of the elevator car consisting of "Up" and "Down" constant pressure buttons, incandescent light with guard, 110 Volt G.F.I. work outlet and an emergency stop switch.
  1. Provide an additional light with guard and G.F.I. work outlet mounted to the bottom of the car and located towards the front for easy access.

## 2.28 PIT EMERGENCY STOP SWITCH

- A. An emergency stop switch shall be provided in the elevator pit, designed to cut off current supply to motor and "down" direction valves and bring the car to rest independent of the regular operating devices.
  1. Locate the pit stop switch in accordance with code.

## 2.29 ALARM BELL

- A. An electric signal bell shall be provided in or adjacent to the elevator hoistway as directed. This bell shall be connected to the alarm button in the car operating panel.

## 2.30 CAR OPERATING PANEL

- A. A car operating panel shall be furnished in the car containing illuminating buttons for each landing, flush-mounted Braille tags, emergency car light with flush lens, door open and close buttons, auto-dial telephone station, emergency stop switch, F.E.R. Phase II key switch, indicator light and signage, alarm button and key switches for light, fan and independent service. All fixture components shall be back plate mounted and shall be incorporated into the swing front return panel of the cab.

1. The auto-dial telephone unit shall be mounted to the backplate and concealed behind the swing front return. Provide a perforated hold pattern in the swing front return panel for speakers and microphone voice transmission.
2. Provide an L.E.D. position indicator with a minimum 2" high characters.
3. The light, fan an independent service key switch along with a 110 Volt G.F.I. outlet, shall be located in a key-locked service cabinet below the body of the car station. The service cabinet door shall be flush with the swing front return with concealed hinges.
4. Provide car stations with all signage and components to comply with NYC Appendix K and all ADA requirements.
5. Provide "on - off" floor lockout key switches adjacent to the Cellar and 3<sup>rd</sup> Floor pushbuttons.

#### 2.31 ILLUMINATED CALL AND CAR BUTTON

- A. Call registration lights shall be provided in each push-button unit. When a button is pressed, it shall illuminate, signaling to the waiting passenger that the call has been registered. Each button shall remain illuminated until the call has been answered.
  1. Provide non-directional satin stainless steel buttons throughout. Acceptable manufacturers are EPCO and Monitor. Button finish shall match the finish of surrounding cab swing front return panel.

#### 2.32 CAR LANTERNS

- A. Lanterns with one stroke up, two strokes down gongs shall be provided.
- B. As soon as the car has reached a predetermined distance from a landing and is set to stop at that landing, the corresponding lantern shall be illuminated and the gong shall sound whether the hall button has been pressed or not and the lantern shall remain illuminated until the car has left that landing. All visual and audible signal timing shall be in accordance with A.D.A. requirements.
- C. Provide backplate mounted fixtures with only the lens projections through the swing front return jamb.

#### 2.33 HALL CALL STATIONS

- A. Provide unit with No. 4 stainless steel faceplates with (1/8" thick) beveled edges and tamper proof fasteners.
- B. Provide F.E.R. Phase I key switch at the main egress level and LED position and direction indicators at each floor.
- C. Include all fire fighters instruction and as required by Appendix K.
- D. Include L.E.D. position and direction indicator in each hall call station.

## 2.34 ELECTRIC WIRING

- A. It shall be the responsibility of the Elevator Contractor to furnish and install complete, necessary, insulated wiring to connect all parts of the equipment. Wiring, conduit, fittings and installation shall be in accordance with Division 16, and comply with the requirements of the National Electric Code.
- B. Insulated wiring shall have a flame retarding and moisture resisting outer cover and shall run in concealed galvanized metal conduit, metallic tubing or wire ducts.
  - 1. Flexible metal conduit shall be permitted for short runs only.
- C. Traveling cables between car and hoistway shall have a flame retarding and moisture resisting outer cover. They shall be flexible and suitably suspended to relieve strains in the individual conductors. The traveling cable shall also include:
  - 1. A minimum of 10% spare conductors, (ends to be left accessible to facilitate connections at a later date).
  - 2. Wiring as required for the auto-dial telephone and firemen's communication (as required per local code).
  - 3. A video co-axial cable type RG 59U, (leave adequate slack in the machine room and top of car to facilitate final hookup).
  - 4. Six (6) pairs of 18 gauge shielded cables, (terminating on terminal strips in the controller and in the car operating station).

## 2.35 TERMINAL LIMIT SWITCHES

- A. Terminal limit switches shall be provided in the hoistway, designed to automatically stop the car at the terminal landings, within the designated top and bottom overtravels.
  - 1. The switches shall be rail mounted with rubber (or similar) rollers which are engaged by a car mounted cam. The beveled section of the cam shall be designed for smooth, quiet engagement of the switches.

## 2.36 CAR ENCLOSURE

- A. A description of the cab interior is as follows:
  - 1. Shell - 14 gauge steel for walls and 12 gauge steel for canopy. Individual panels shall not exceed 18" in width and shall be reinforced to provide for a flat, rigid surface. Apply spray on sound deadening on rear of shell. Sound deadening material shall be non-combustible and applied in accordance with manufacturer's recommendation. Provide a minimum 1/8" consistent thickness on all surfaces. Provide welded re-enforcement grounds (minimum 1/4" thick with weld nut) on the rear of the shell for handrail mounting. Provide all cutouts in the shell as required for ventilation and fixture installation.

2. Interior Panels - Interior panel assembly shall be a 3/4" thick MDF (Class "A" substrate) backer boards with all exposed surfaces. 18 Gauge non-directional satin finish.
3. Front Return Panels - Provide 14 gauge, non-directional satin stainless steel full front swing return panels. The swing return panels shall have a concealed continuous hinge and a substantial locking system. Provide no more than a 1/4" clearance between the swing return panel and the finish floor and a 1/16" between the swing return panel and transom.  
  
The swing return panels and hinging system shall be suitably re-enforced to prevent appreciable or permanent sagging or deflection when opened for maintenance.
4. Transom - 14 gauge non-directional satin stainless steel suitably re-enforced. Apply sound deadening to the back of the transom as specified above.
5. Doors - 16 gauge non-directional satin stainless steel with full height rubber astegral at the leading edge of each door panel. Provide the same construction as for the hoistway doors.
6. Sills - Extruded aluminum.
7. Ceiling - 22 gauge non-directional satin stainless steel on 3/4" MDF backer board. All edges to be stainless steel.  
  
Provide rimless halogen downlighting to be integral with the suspended ceiling. One ceiling panel shall be removable for top emergency egress. A substantial, positive locking mechanism shall be utilized to hold the removable panel in place, flush with the adjoining panels and flat throughout. Show all details on the shop drawings.
8. Handrails - Provide a flat bar stainless steel handrail along the back wall. Design the handrail to withstand a minimum 500 lb. vertical point load at the center between handrail supports.  
  
Handrail mounting equipment shall be solid non-directional satin stainless steel and spaced no more than 24" apart.
9. Exhaust Fan - Two-speed Nylube fan, mounted on vibration isolation pads.
10. Protection Pads - Provide one (1) set of protection pads per elevator (cost is included in the base bid). Provide heavy-duty vinyl impregnated nylon with 1/4" thick padding. Pads are to be fire retardant and treated to be self-extinguishing. Include a metal stiffening bar on top of pads and include retaining clips to hold the pads in place. Provide pads in a color as selected by the Commissioner.

- |                            |   |
|----------------------------|---|
| 11. Pad Buttons -          | Provide extended type stainless steel pad buttons bolted through the shell. Provide weld nuts on rear of shell to accept the pad buttons.               |
| 12. Base -                 | 12 gauge non-directional satin stainless steel.   |
| 13. Concealed Vent Slots - | Design the cab interior to provide for ventilation openings above the base behind the wall panels.  |
| 14. Flooring -             | 12" x 12" black rubber studded floor tile.  |
| 15. Reveals, Frieze        | All exposed reveals, friezes, etc. shall be non-directional satin stainless and Other Exposed Areas shall be steel with a non-directional satin finish. |
| 16. Engraving -            | No applied plates will be accepted. No manufacturer's logos shall be visible.   |

### 2.37 PERFORMANCE

- A. Speed to be within 5% of rated speed in both directions of travel and under any load.
- B. Leveling to be within 1/4" of the Hoistway Sill level.
- C. Maximum 400 psi working pressure.

### 2.38 HANDICAPPED REQUIREMENTS AND COMMUNICATIONS

- A. Locate a door reopening device at 5" and 29" above the finish floor, the alarm button and emergency stop switch at 35" and the floor and control button not more than 54".
- B. Provide raised markings in the panel to the left of the floor and control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons. Plates, if used, shall be stud mounted and recessed flush with the car station.
- C. The centerline of the hall push-button station shall be 42" above the floor. The hall lanterns or cab lantern shall sound once for the "up" direction and twice for the "down" direction.
- D. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor. Designations shall be 2" high, raised .03" and shall be as selected by the Commissioner.
- E. Provide an audible signal to tell passenger that the car is stopping or passing a floor served by the elevator.
- F. Provide emergency communications and auto-dial telephone in the elevator cab and machine room. System shall allow for communications between the machine room and cab in accordance with Code. At a minimum, the auto-dial telephone shall include the following features:
  - 1. Fully A.D.A. compliance including "Call Acknowledged Indicator".
  - 2. Powered by phone line only.

3. Two number capability.
4. Automatic location identification message.
5. Non-volatile memory.
6. Remote programming.
7. Adjustable line disconnect timer.
8. Call back capabilities.
9. Communication between machine room and cab to comply with Appendix K and all related code requirements.

### 2.39 MATERIALS

- A. Sheet Steel for Exposed Work: Stretcher-leveled, cold rolled, commercial-quality carbon steel, complying with ASTM A366, matte finish.
- B. Sheet Steel for Unexposed Work: Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A569.
- C. Structural Steel Shapes and Plates: ASTM A36 and AISI 1018.
- D. Stainless Steel: Type 300 Series complying with ASTM A167, with standard tempers and hardness required for fabrication, strength and durability. Supply with mechanical finish on fabricated work in the location shown or specified with texture and reflectivity required (Federal and NAAMM nomenclature). Protect with adhesive plastic film or paper covering. All finishes specified as "satin" to be Manufacturer's standard directional polish that complies with commercial No. 4 requirements. All finishes specified as "mirror" to be Manufacturer's standard mirror polish that complies with commercial No. 8 requirements.
- E. Bronze: Cold finished muntz metal type UNS C28000-HO2 complying with ASTM B36/B36M. Supply with mechanical finish on fabricated work in the location shown or specified with texture and reflectivity required (Federal and NAAMM nomenclature). Protect with adhesive plastic film or paper covering. All finishes specified as "satin" to be Manufacturer's standard directional polish that complies with commercial No. 4 requirements. All finishes specified as "mirror" to be Manufacturer's standard mirror polish that complies with commercial No. 8 requirements.
- F. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.
- G. Plastic Laminate: ASTM E84 Class A and NEMA LD3, 0.050" (1.3 mm) up to 1/16" (1.6 mm) nominal thickness. Exposed surfaces to have color selected by Commissioner from Manufacturer's standard selection.
- H. Fire Retardant Treated Particle Board Panels: Minimum 3/4" (13mm) thick backup for plastic laminate veneered panels provided with suitable anti-warp backing; to meet ASTM E84 Class "A" rating with flame-spread rating of 25 or less.

- I. Paint: Unexposed Steel and/or Iron: Clean metal of oil, grease, scale and other foreign matter and paint one shop coat of Manufacturer's standard rust-resistant primer. Primer shall be of a low V.O.C. water-based type. Galvanized metal need not be painted.
- J. Exposed Steel: Clean exposed metal of oil, grease, scale and other foreign matter. Eliminate any dents, scratches, or other defects that would affect the final finish. For material delivered with primer coat only, apply two coats of manufacturer's standard baked enamel primer. For material delivered with a finished coat, apply an additional two coats of manufacturer's standard baked enamel of a color selected by the Commissioner from the manufacturer's standard color selection.

## PART 3 - EXECUTION

### 3.1 DESIGN REQUIREMENTS

#### A. Electrical Design and Wiring:

1. All wiring shall be Underwriters approved stranded type in accordance with the latest International Electrical Code. Minimum size permitted shall be No. 18 AWG. These wires shall be installed in conduit with steel outlet boxes. All electrical boxes (Hall pushbutton boxes, Car Stations, Terminal boxes, pull boxes, etc.) and other similar items shall be of approved construction, hot-dip galvanized or electroplated with Zinc Dichromate. All electrical boxes exceeding 150 cubic inches shall be supported independently of the conduits.
2. All raceway shall be galvanized EMT and/or trough.
3. Furnish all materials and completely wire all parts of the electrical equipment of the elevator, including electrical devices on hatch doors.
4. Switches, relays, etc. on controller, starter, and signal panels and similar items on other parts of the equipment, shall be the latest model. Any parts showing wear or damage during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced by the Contractor as part of his Contract obligations.
5. Contacts in elevator motor circuits, which are intended to be opened by the governors or other safety devices, shall be copper to carbon, or other approved non-fusing type. Relays shall be designed for visual inspection and easy replacement of contacts with minimal disassembly, and keyed parts for ease in reassembly. They shall be equipped with suitable blowout coils, vanes, barriers, etc., to prevent undue arcing and heating. Current ratings for silver-to-silver contacts on relays used in motor circuit applications shall be at least three times the current draw of the running ratings of the motor. Contacts on control and signal relays and switches shall generally be of silver alloy.
6. Conduits shall be run and connected to suitable approved connection boxes at all outlets, apparatus and panels.

7. The conduits shall be of such size that the wires or cables can be readily installed and replaced, if necessary. No conduit or raceway shall be less than 3/4 inch trade size, except that for small devices such as door switches, interlocks, etc. for which, 1/2 inch conduit may be used. The total overall cross-sectional area of the wires contained in any conduit shall not exceed 40 percent of the internal area of the conduit. Approved strain boxes shall be installed for all vertical runs in accordance with Code.
8. Conduits shall be neatly and systematically run. All exposed conduit and boxes shall be supported by straps (wire or plastic ties are not acceptable), hangers, or clamps to the structural steel, reinforced concrete, or other approved supports. Riser conduits and/or trough in hoistway shall be supported at each floor level.
9. Connections of all wires larger than No. 8 AWG shall be made with copper connectors except for Mainline Disconnect switches where UL approved aluminum lugs/connectors may be used. Metal eyelets pressed around the strands shall be used for all connections of smaller stranded conductors.
10. All terminals shall be tagged or identified in a permanent legible manner to match car and hoistway junction boxes and controllers.
11. In all machine rooms, hoistways, etc., install the equipment to allow easy access for maintenance.
12. All screws used for terminal connections of all wiring (machine room, hoistway and pit) shall be of proper size and type as approved.
13. All connections of wires to controller and motor lead terminals from external circuits shall be made with "copper" soldered lugs or "copper" eyelet compression type lugs.
14. All elevator lights (top and bottom of car and pit) and A.C. alarm bells shall be fused and located in the elevator machine room in a separate approved box, or on the controller. The fuses shall be identified (permanent label) "lights and alarm bells".
15. All receptacles in elevator machine room, pits, and car shall be Ground-Fault Circuit-Interrupter type (GFCI).
16. All grounding shall be done in accordance with the latest International Electrical Code as adopted by local jurisdiction. Grounding of machine to bedplate is not permitted.

B. Mechanical Design Requirements:

1. All bearings, pivots, guides, guide shoes, gearing, door hanger sheaves, door hanger tracks, and elements subject to friction or rolling wear shall be accurately finished and arranged for convenient lubrication. Provide means for flushing and draining the larger bearings and gear cases. All oiling holes shall have dustproof, self-closing caps.
2. All bearings shall be sized for heavy-duty commercial elevator usage.

3. Ball and roller bearings shall be fully enclosed. Loading, lubrication, support and all other conditions of use shall be in accordance with the recommendations of the bearing manufacturer. Bearings for motors shall be of the open (non-sealed) type with approved fittings for grease lubrication or approved sealed bearings. The bearings shall not be part of the end bell housing, but shall be separate for easy removal and replacement.
4. All bolts used to connect moving parts, bolts carrying hoisting stresses, and all other bolts except guide rail bolts, subject to vibration or shock, shall be designed to prevent loosening of the nuts and bolts. Bolts transmitting shearing stresses between machine parts shall have tight body fit in drilled and reamed holes. All bolts subject to vibration shall be provided with split ring lock washers. All guide rail vane brackets shall be through bolted and provided with proper bolts, nuts and lock washers.
5. All parts shall be manufactured to high precision standards so that wearing parts will be readily interchangeable with stock repair parts with a minimum of field fittings.
6. All bearing and sliding surfaces of shafts, pins, bearings, bushings, guides, etc., shall be smoothly and accurately finished. During the maintenance period, all bearings shall be regularly checked for any tendency to run hot and any defects corrected.
7. Protection for moving parts: Belts, pulleys, chains, gears, couplings, projecting set screws, keys, and other rotating parts located so that any person can come in close proximity thereto, shall be fully enclosed or properly guarded.
8. All exposed hardware on public hall side shall be of tamperproof design constructed of stainless steel with No. 4 satin finish.
9. Tamperproof stainless steel spanner head screws shall be used for all exposed locations, for all landing button panels, certificate frames, interlocks and car lighting fixtures. Supply one Spanner head wrench for each size screw. Tamperproof screws shall be of the "captive type". Self-tapping screws or self-tapping machine screws shall not be permitted.
10. All locks and key operated switches shall be five (5) pin tumbler type. All keys where permitted shall be of the captive type. Furnish two (2) keys for each lock and/or switch for each elevator. All locks shall be mastered to one master key. Furnish four (4) master keys. Firemen's Service keys shall meet Local Code requirements.

### 3.2 WORKMANSHIP AND INSTALLATION

#### A. Inspection and Tests:

1. Failure to keep the shutdown time within the specified limit may result in cancellation of the contract by the City of New York. Any delays in the approved schedule shall be brought immediately to the attention of the Commissioner, in writing, along with the proposed revised schedule.
2. Arrange and schedule final inspection of all work and notify the Commissioner in writing that the work has been thoroughly checked and is ready for final inspection. Testing shall be performed under the direction of authorized Inspectors.

3. When the elevator work is completed, conduct operating tests to the satisfaction of the Commissioner and the appropriate City Agencies having jurisdiction. The inspection procedure outlined in the ASME A17.2 for the Inspection of Elevators, Escalators and Moving Walks, Inspector's Manual will form a part of the final inspection.
4. Furnish all test instruments, labor and materials, required at the time of final inspection. They shall include, but not necessarily be limited to, standard 500 pound test weights.
5. Certificates: Before final acceptance, furnish all certificates required by all Public Agencies having jurisdiction. All certificates shall be turned over to the Commissioner with copies to the Commissioner and Consultant.
6. If requested by the Consultant, the following tests shall be made by the Field Engineer or Adjuster of the Elevator Company in the company of the Consultant or the Consultant's Representative, at the time of final inspection:
  - a. FULL LOAD-RUN TEST: Shall be for one hour continuous run, with full specified rated load in the car. During the test run, the car shall be stopped at all floors in both directions of travel for a standing period of ten (10) seconds per floor.
  - b. SPEED TEST: The actual speed of the elevator car shall be determined in both directions of travel and with full contract load and no load in the elevator car. Speed tests shall be made before and also after the full load run test. Speed shall be determined by applying a tachometer to the car hoisting cables. The actual measured speed of elevator car with full load in "UP" direction shall be within 5 percent of specified rated speed.
  - c. TEMPERATURE RISE TEST: The temperature rise of the hoisting motor shall be determined during the full load test run. Temperatures shall be measured by the use of thermometer on top of windings and shielded by cotton waste or putty. Temperature rise of the equipment shall not exceed the temperature rise for the class of insulation used in the motor tests, shall be started only when all parts of the equipment are within 5° centigrade of the ambient temperature at time of starting test.
  - d. CAR STOPPING ACCURACY: Elevator stopping shall be tested for accuracy of landing within 1/2 inch plus or minus (from finished floor) at all floors with no load in car, balanced load in car and full load, in both directions of travel. Accuracy of floor landing shall be determined both before and after the full load run test.
  - e. INSULATION RESISTANCE TEST: The complete wiring systems of elevator shall be free from short circuits and grounds, and the insulation resistance of systems determined by use of a "Megger", shall be not less than one megohm. (Solid State Controllers are excluded from this test).
  - f. CAR SAFETY AND GOVERNOR TESTS: The car safety and governor shall be tested as outlined in Section 1003 ASME A17.1 Code.
  - g. STATIC CAR BALANCING: The car shall be statically balanced in its sling so that the total lateral force on top car guide assemblies shall be a maximum of forty pounds (40 lbs.) for all positions of the car in the shaftway.
  - h. DYNAMIC SYSTEM BALANCING: Car and counterweight suspension system shall be dynamically balanced so that total weight of counterweight and its frame shall be equal to total weight of unloaded car and its sling, plus forty percent (40%) of contract load with an accuracy of plus or minus fifty pounds (50 lbs).

- i. ELECTRICAL PROTECTIVE DEVICES: All electrical protective devices in the wiring system (Fuses, Overloads, etc.) shall be tested for proper operation.
- j. The FIREMAN'S SERVICE SYSTEM shall be tested for proper operation.
- k. PASSENGER OVERLOAD TEST: The car shall be tested with 125% of rated load and shall conform to all passenger overload regulations in ASME A17.1. In addition, the car shall be subjected to the Acceptance and 5 Year Tests for Drive Machine Brakes in ASME A17.2.1, Inspectors' Manual for Electric Elevators.
- l. BUFFER TEST: Car and Counterweight Oil Buffers shall be tested in accordance with the requirements for Acceptance and 5 Year Tests for Oil Buffers, as described in ASME A17.2.1, Inspectors' Manual for Electric Elevators.
- m. TEST SECURITY INTEGRATION

B. Cleaning, Adjustment, and Final Acceptance:

1. At the end of each day, remove and legally dispose of all refuse and dirt resulting from work of this contract. All work areas shall be left "broom clean". After completion of work, thoroughly clean and adjust elevators so that they are in proper operating condition. Remove from site, all materials which are not required as part of finished work.

C. Safety of Persons and Property:

1. Plan the work and execute in an organized and orderly manner. Danger and warning signs shall be prominently displayed, and exercise every precaution to protect pedestrians.
2. Erect construction barriers around the work area. Keep dust and noise at a minimum. Barricades shall not have protruding nails or sharp jagged edges.
3. If there are two (2) cars in a common shaft, furnish and install temporary wire screening between elevator hoistways. The screening shall be full depth and height of the elevator hoistways and shall be fastened to wood blocking which, in turn, is securely fastened to the Building structure. Wire screening shall be ½" x ½" #19 (.041 dia) galvanized wire mesh. All wire screening, wood blocking, protruding nails, etc. shall be removed after completion of work. Damaged concrete shall be repaired.

D. Protection:

1. Protect all items against dirt and damage. The Contractor shall be held fully responsible for all damage until final acceptance. Any equipment or property of the City of New York damaged by this Contractor or his employees shall be restored to its original condition or replaced without cost to the City of New York.

E. Contractor's Shop:

1. The successful bidder, shall, before being awarded this Contract, prove to the Commissioner to its satisfaction that he maintains or has access to an adequate shop within a twenty (20) mile radius of the project, carry in stock, all spare parts furnished under this Contract which are subject to periodic failure.

F. Storage:

1. The Commissioner will designate a suitable area where the Contractor may store equipment until the work is completed. All equipment shall be stored at the sole risk of the Contractor.
2. The Contractor shall provide his own lock and key. The assigned storage area shall be left clear and unencumbered of material or debris and shall be left in a broom-clean condition at the completion of the work. An approved Type "C" fire extinguisher shall be provided and installed on a wall, for each storage area assigned to the Contractor.

G. Access to Elevator Equipment:

1. The Contractor shall provide keys for access to all the elevator equipment.

H. Punch List Items:

1. All punch list items shall be completed within thirty (30) consecutive calendar days of receipt of Punch List items.

3.3 SHAFT CLEANING

- A. The entire shaft, from the pit floor to the underside of the machine room slab, shall be thoroughly cleaned of all debris, lint, grease, dust, etc.

3.4 HOISTWAY PROJECTIONS

- A. Provide seventy-five (75°) degree concrete bevels on all ledge projections in excess of two inches of all elevator hoistways on all floors.

3.5 PAINTING

A. Summary of Work Included:

1. Clean all ironwork and paint with one shop coat of primer coating. Do not paint galvanized steel with enamel coating. After erection, touch up bare spots on iron work. Apply final field coat of paint similar to shop coat.
2. Touch up any wall and ceiling surfaces damaged by work of this project with at least two coats of paint to match finish.
3. Paint metal with one coat of an oil based rust inhibitive primer and one coat of an enamel alkyd paint.

B. Samples:

1. Before placing orders for materials, submit the name or names of manufacturers for approval.

2. Upon approval of the manufacturer, submit samples of all materials. Approval of the samples will be based upon manufacturers certifying that the products proposed are the standard best or top brands produced by them and are readily obtainable as such in "over the counter" sales. Do not proceed until all samples are approved.
3. All materials shall be further subject to field tests from time to time as the work progresses.

C. General Painting Requirements

1. Delivery: Deliver all material in their original containers with seals unbroken. Order in advance, in large enough quantities and in ample time to facilitate the work.
2. Storage of Materials: Store materials where directed. Keep storage space clean and accessible at all times. Remove paint or oil-soaked rags, waste, etc. from the premises at the close of each day's work. Absolutely no flammable or combustible materials are to be stored on the City of New York's property.
3. Protection: Provide suitable coverings to protect all work and all adjacent surfaces and objects.
4. Cleaning Up: Upon completion of the work, remove all surplus materials, empty containers, rags, and other debris from the premises. Touch up finished work where directed. Remove daubs or spatters of paint from all surfaces.

D. Workmanship:

1. Carefully prepare all surfaces to be painted. Do not apply paint until the surfaces are absolutely dry and clean.
2. Shop or priming coats shall be put in good condition; touch up any bare or abraded spots.
3. Wire brush all metal surfaces. Remove all abrasions in the prime coat, rust, scale, etc. Clean and touch up damaged areas to match prime coat. Clean metal work with solvent to remove all dirt and grease.
4. Clean concrete and masonry surfaces to be painted of all grit, dirt and loose material. Patch scratches, cracks, holes and similar defects in wall and ceiling surfaces to provide a smooth flush surface. Patched portions shall be given a coat of primer sealer in addition to all other specified coats.
5. Allow each coat of paint to dry before subsequent coat is applied. The finished work shall be free from runs or sags, defective brushing or brush marks, and clogging of lines and angles. Exposed surfaces shall be left clean.

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## SECTION 210500

### COMMON WORK RESULTS FOR FIRE SUPPRESSION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Mechanical sleeve seals.
3. Sleeves.
4. Escutcheons.
5. Grout.
6. Equipment installation requirements common to equipment sections.
7. Painting and finishing.
8. Concrete bases.
9. Supports and anchorages.

##### 1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
  1. CPVC: Chlorinated polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
  1. EPDM: Ethylene-propylene-diene terpolymer rubber.
  2. NBR: Acrylonitrile-butadiene rubber.

#### 1.4 SUBMITTALS

A. Product Data: For the following:

1. Mechanical sleeve seals.
2. Escutcheons.

B. Welding certificates.

#### 1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Fire-Suppression Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

#### 1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for fire-suppression items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

## 2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 21 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

## 2.3 JOINING MATERIALS

- A. Refer to individual Division 21 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

## 2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
  1. Manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: **EPDM** interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: **Carbon steel**. Include two for each sealing element.
4. Connecting Bolts and Nuts: **Carbon steel with corrosion-resistant coating** of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.5 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

## 2.6 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
  1. Finish: **Rough brass**.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
  1. Finish: **Rough brass**.
- E. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- F. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

## 2.7 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

## PART 3 - EXECUTION

### 3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 21 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
  1. New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    - e. Bare Piping at Ceiling Penetrations in Finished Spaces: **One-piece Split-casting One-piece or split-casting**, cast-brass type with polished chrome-plated finish.
    - f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with **polished chrome-plated rough-brass** finish.
    - g. Bare Piping in Equipment Rooms: One-piece, cast-brass type.

- h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Permanent sleeves are not required for holes formed by removable PE sleeves.
- N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
    - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
    - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
    - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
      - 1) Seal space outside of sleeve fittings with grout.
  - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
  - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
  - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- Q. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten

bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- R. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- S. Verify final equipment locations for roughing-in.
- T. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### 3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 21 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Braze Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
  - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

### 3.3 PAINTING

- A. Painting of fire-suppression systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### 3.4 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
  - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
  - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
  - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
  - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
  - 7. Use **3000-psi**, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "**Cast-in-Place Concrete Miscellaneous Cast-in-Place Concrete.**"

### 3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor fire-suppression materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

### 3.6 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor fire-suppression materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

### 3.7 GROUTING

- A. Mix and install grout for fire-suppression equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.

- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

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## SECTION 211313

### WET-PIPE SPRINKLER SYSTEMS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Pipes, fittings, and specialties.
  - 2. Fire-protection valves.
  - 3. Fire-department connections.
  - 4. Sprinklers.
  - 5. Alarm devices.
  - 6. Manual control stations.
  - 7. Control panels.
  - 8. Pressure gages.

##### 1.3 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

##### 1.4 SYSTEM DESCRIPTIONS

- A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

##### 1.5 PERFORMANCE REQUIREMENTS

- A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional Engineer, using performance requirements and design criteria indicated.
  - 1. Available fire-hydrant flow test records indicate the following conditions:
    - a. Date:
    - b. Time: a.m. p.m.
    - c. Performed by: of
    - d. Location of Residual Fire Hydrant R:
    - e. Location of Flow Fire Hydrant F:
    - f. Static Pressure at Residual Fire Hydrant R:
    - g. Measured Flow at Flow Fire Hydrant F:

- h. Residual Pressure at Residual Fire Hydrant R:
- C. Sprinkler system design shall be approved by authorities having jurisdiction.
  - 1. Margin of Safety for Available Water Flow and Pressure: 10 to 20 percent, including losses through water-service piping, valves, and backflow preventers.
  - 2. Sprinkler Occupancy Hazard Classifications:
    - a. Building Service Areas: Ordinary Hazard, Group 1.
    - b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
    - c. General Storage Areas: Ordinary Hazard, Group 1.
    - d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
    - e. Office and Public Areas: Light Hazard.
    - f. Theatre: Light Hazard.
  - 3. Minimum Density for Automatic-Sprinkler Piping Design:
    - a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
    - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
  - 4. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:
    - a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
    - b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.
- D. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7.

#### 1.6 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. LEED Submittal:
  - 1. Product Data for Credit EQ 4.1: For solvent cements and adhesive primers, including printed statement of VOC content and chemical components.
- C. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: For power, signal, and control wiring.
- D. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Domestic water piping.
  - 2. Compressed air piping.
  - 3. HVAC hydronic piping.
  - 4. Items penetrating finished ceiling include the following:

- a. Lighting fixtures.
  - b. Air outlets and inlets.
- F. Qualification Data: For qualified Installer and professional Commissioner.
  - G. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
  - H. Welding certificates.
  - I. Fire-hydrant flow test report.
  - J. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
  - K. Field quality-control reports.
  - L. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
    - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional Commissioner.
- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
  - 1. NFPA 13, "Installation of Sprinkler Systems."
  - 2. NFPA 13R, "Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height."
  - 3. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."

#### 1.8 PROJECT CONDITIONS

- A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by the City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:
  - 1. Notify Commissioner no fewer than two days in advance of proposed interruption of sprinkler service.

2. Do not proceed with interruption of sprinkler service without Commissioner's written permission.

#### 1.9 COORDINATION

- A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

#### 1.10 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

### PART 2 - PRODUCTS

#### 2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

#### 2.2 STEEL PIPE AND FITTINGS

- A. Standard Weight, Galvanized- and Black-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
- B. Schedule 30, Galvanized- and Black-Steel Pipe: ASTM A 135; ASTM A 795/A 795M, Type E; or ASME B36.10M, wrought steel; with wall thickness not less than Schedule 30 and not more than Schedule 40. Pipe ends may be factory or field formed to match joining method.
- C. Thinwall Galvanized- and Black-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, threadable, with wall thickness less than Schedule 30 and equal to or greater than Schedule 10. Pipe ends may be factory or field formed to match joining method.
- D. Schedule 10, Black-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10, plain end.
- E. Nonstandard OD, Thinwall Black-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, thinwall, with plain ends and wall thickness less than Schedule 10.
- F. Hybrid Black-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, lightwall, with wall thickness less than Schedule 10 and greater than Schedule 5.
- G. Schedule 5 Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, lightwall, with plain ends.
- H. Galvanized- and Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.
- I. Galvanized and Uncoated, Steel Couplings: ASTM A 865, threaded.

- J. Galvanized and Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- K. Malleable- or Ductile-Iron Unions: UL 860.
- L. Cast-Iron Flanges: ASME 16.1, Class 125.
- M. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
- N. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.
- O. Grooved-Joint, Steel-Pipe Appurtenances:
  - 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Anvil International, Inc.
    - b. Corcoran Piping System Co.
    - c. National Fittings, Inc.
    - d. Shurjoint Piping Products.
    - e. Tyco Fire & Building Products LP.
    - f. Victaulic Company.
  - 2. Pressure Rating: 175 psig 250 psig 300 psig minimum.
  - 3. Galvanized and Uncoated, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
  - 4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.
- P. Steel Pressure-Seal Fittings: UL 213, FM-approved, 175-psig pressure rating with steel housing, rubber O-rings, and pipe stop; for use with fitting manufacturers' pressure-seal tools.
  - 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Victaulic Company.
    - b.

### 2.3 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L and ASTM B 88, Type M water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

F. Copper Pressure-Seal Fittings:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Viega; Plumbing & Heating Systems.
2. Standard: UL 213.
3. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
4. NPS 2-1/2 to NPS 4: Cast-bronze fitting with EPDM-rubber O-ring seal in each end.

G. Grooved-Joint, Copper-Tube Appurtenances:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Anvil International, Inc.
  - b. Shurjoint Piping Products.
  - c. Victaulic Company.
  - d.
2. Grooved-End, Copper Fittings: ASTM B 75, copper tube or ASTM B 584, bronze castings.
3. Grooved-End-Tube Couplings: To fit copper-tube dimensions, with design similar to AWWA C606. Include ferrous housing sections, EPDM-rubber gasket suitable for hot and cold water, and bolts and nuts.

H. Copper-Tube, Extruded-Tee Connections:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. T-DRILL Industries Inc.
2. Description: Tee formed in copper tube according to ASTM F 2014.

2.4 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free.
  1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
  2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

- D. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

## 2.5 LISTED FIRE-PROTECTION VALVES

### A. General Requirements:

- 1. Valves shall be UL listed or FM approved.
- 2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.
- 3. Minimum Pressure Rating for High-Pressure Piping: 250 psig 300 psig.

### B. Ball Valves:

- 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Anvil International, Inc.
  - b. Victaulic Company.
- 3. Standard: UL 1091 except with ball instead of disc.
- 4. Valves NPS 1-1/2 and Smaller: Bronze body with threaded ends.
- 5. Valves NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
- 6. Valves NPS 3: Ductile-iron body with grooved ends.

### C. Bronze Butterfly Valves:

- 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Fivalco Inc.
  - b. Global Safety Products, Inc.
  - c. Milwaukee Valve Company.
- 3. Standard: UL 1091.
- 4. Pressure Rating: 175 psig.
- 5. Body Material: Bronze.
- 6. End Connections: Threaded.

### D. Iron Butterfly Valves:

- 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Anvil International, Inc.
  - b. Fivalco Inc.

- c. Global Safety Products, Inc.
  - d. Kennedy Valve; a division of McWane, Inc.
  - e. Milwaukee Valve Company.
  - f. NIBCO INC.
  - g. Pratt, Henry Company.
  - h. Shurjoint Piping Products.
  - i. Tyco Fire & Building Products LP.
  - j. Victaulic Company.
- 3. Standard: UL 1091.
  - 4. Pressure Rating: 175 psig.
  - 5. Body Material: Cast or ductile iron.
  - 6. Style: Lug or wafer.
  - 7. End Connections: Grooved.

E. Check Valves:

- 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. AFAC Inc.
  - b. American Cast Iron Pipe Company; Waterous Company Subsidiary.
  - c. Anvil International, Inc.
  - d. Clow Valve Company; a division of McWane, Inc.
  - e. Crane Co.; Crane Valve Group; Crane Valves.
  - f. Crane Co.; Crane Valve Group; Jenkins Valves.
  - g. Crane Co.; Crane Valve Group; Stockham Division.
  - h. Fire-End & Croker Corporation.
  - i. Fire Protection Products, Inc.
  - j. Fivalco Inc.
  - k. Globe Fire Sprinkler Corporation.
  - l. Groeniger & Company.
  - m. Kennedy Valve; a division of McWane, Inc.
  - n. Matco-Norca.
  - o. Metraflex, Inc.
  - p. Milwaukee Valve Company.
  - q. Mueller Co.; Water Products Division.
  - r. NIBCO INC.
  - s. Potter Roemer.
  - t. Reliable Automatic Sprinkler Co., Inc.
  - u. Shurjoint Piping Products.
  - v. Tyco Fire & Building Products LP.
  - w. United Brass Works, Inc.
  - x. Venus Fire Protection Ltd.
  - y. Victaulic Company.
  - z. Viking Corporation.
  - aa. Watts Water Technologies, Inc.
- 3. Standard: UL 312.
- 4. Pressure Rating: 250 psig minimum 300 psig.
- 5. Type: Swing check.
- 6. Body Material: Cast iron.
- 7. End Connections: Flanged or grooved.

F. Bronze OS&Y Gate Valves:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Crane Co.; Crane Valve Group; Crane Valves.
  - b. Crane Co.; Crane Valve Group; Stockham Division.
  - c. Milwaukee Valve Company.
  - d. NIBCO INC.
  - e. United Brass Works, Inc.
3. Standard: UL 262.
4. Pressure Rating: 175 psig.
5. Body Material: Bronze.
6. End Connections: Threaded.

G. Iron OS&Y Gate Valves:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. American Cast Iron Pipe Company; Waterous Company Subsidiary.
  - b. American Valve, Inc.
  - c. Clow Valve Company; a division of McWane, Inc.
  - d. Crane Co.; Crane Valve Group; Crane Valves.
  - e. Crane Co.; Crane Valve Group; Jenkins Valves.
  - f. Crane Co.; Crane Valve Group; Stockham Division.
  - g. Hammond Valve.
  - h. Milwaukee Valve Company.
  - i. Mueller Co.; Water Products Division.
  - j. NIBCO INC.
  - k. Shurjoint Piping Products.
  - l. Tyco Fire & Building Products LP.
  - m. United Brass Works, Inc.
  - n. Watts Water Technologies, Inc.
3. Standard: UL 262.
4. Pressure Rating: 250 psig minimum 300 psig.
5. Body Material: Cast or ductile iron.
6. End Connections: Flanged or grooved.

H. Indicating-Type Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

- a. Anvil International, Inc.
  - b. Fivalco Inc.
  - c. Global Safety Products, Inc.
  - d. Kennedy Valve; a division of McWane, Inc.
  - e. Milwaukee Valve Company.
  - f. NIBCO INC.
  - g. Shurjoint Piping Products.
  - h. Tyco Fire & Building Products LP.
  - i. Victaulic Company.
- 3. Standard: UL 1091.
  - 4. Pressure Rating: 175 psig minimum.
  - 5. Valves NPS 2 and Smaller:
    - a. Valve Type: Ball or butterfly.
    - b. Body Material: Bronze.
    - c. End Connections: Threaded.
  - 6. Valves NPS 2-1/2 and Larger:
    - a. Valve Type: Butterfly.
    - b. Body Material: Cast or ductile iron.
    - c. End Connections: Flanged, grooved, or wafer.
  - 7. Valve Operation: Integral electrical, 115-V ac, prewired, single-circuit, supervisory switch electrical, 115-V ac, prewired, two-circuit, supervisory switch visual indicating device.

I. NRS Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. American Cast Iron Pipe Company; Waterous Company Subsidiary.
  - b. American Valve, Inc.
  - c. Clow Valve Company; a division of McWane, Inc.
  - d. Crane Co.; Crane Valve Group; Stockham Division.
  - e. Kennedy Valve; a division of McWane, Inc.
  - f. Mueller Co.; Water Products Division.
  - g. NIBCO INC.
  - h. Tyco Fire & Building Products LP.
  - i.
- 3. Standard: UL 262.
- 4. Pressure Rating: 250 psig minimum 300 psig.
- 5. Body Material: Cast iron with indicator post flange.
- 6. Stem: Nonrising.
- 7. End Connections: Flanged or grooved.

2.6 TRIM AND DRAIN VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum.

B. Angle Valves:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Fire Protection Products, Inc.
  - b. United Brass Works, Inc.
  - c.

C. Ball Valves:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Affiliated Distributors.
  - b. Anvil International, Inc.
  - c. Barnett.
  - d. Conbraco Industries, Inc.; Apollo Valves.
  - e. Fire-End & Croker Corporation.
  - f. Fire Protection Products, Inc.
  - g. Flowserve.
  - h. FNW.
  - i. Jomar International, Ltd.
  - j. Kennedy Valve; a division of McWane, Inc.
  - k. Kitz Corporation.
  - l. Legend Valve.
  - m. Metso Automation USA Inc.
  - n. Milwaukee Valve Company.
  - o. NIBCO INC.
  - p. Potter Roemer.
  - q. Red-White Valve Corporation.
  - r. Southern Manufacturing Group.
  - s. Stewart, M. A. and Sons Ltd.
  - t. Tyco Fire & Building Products LP.
  - u. Victaulic Company.
  - v. Watts Water Technologies, Inc.
  - w.

D. Globe Valves:

1. Manufacturers: Subject to compliance with requirements Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Fire Protection Products, Inc.
  - b. United Brass Works, Inc.
  - c.

E. Plug Valves:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Southern Manufacturing Group.
- b.

## 2.7 SPECIALTY VALVES

### A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating:
  - a. Standard-Pressure Piping Specialty Valves: 175 psig minimum.
  - b. High-Pressure Piping Specialty Valves: 250 psig minimum 300 psig.
3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

### B. Alarm Valves:

1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. AFAC Inc.
  - b. Globe Fire Sprinkler Corporation.
  - c. Reliable Automatic Sprinkler Co., Inc.
  - d. Tyco Fire & Building Products LP.
  - e. Venus Fire Protection Ltd.
  - f. Victaulic Company.
  - g. Viking Corporation.
3. Standard: UL 193.
4. Design: For horizontal or vertical installation.
5. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber, and fill-line attachment with strainer.
6. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
7. Drip Cup Assembly: Pipe drain with check valve to main drain piping.

### C. Automatic (Ball Drip) Drain Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. AFAC Inc.
  - b. Reliable Automatic Sprinkler Co., Inc.

- c. Tyco Fire & Building Products LP.
- d.
- 3. Standard: UL 1726.
- 4. Pressure Rating: 175 psig minimum.
- 5. Type: Automatic draining, ball check.
- 6. Size: NPS 3/4.
- 7. End Connections: Threaded.

## 2.8 FIRE-DEPARTMENT CONNECTIONS

### A. Flush-Type, Fire-Department Connection:

- 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. AFAC Inc.
  - b. Elkhart Brass Mfg. Company, Inc.
  - c. GMR International Equipment Corporation.
  - d. Guardian Fire Equipment, Inc.
  - e. Potter Roemer.
  - f.
- 3. Standard: UL 405.
- 4. Type: Flush, for wall mounting.
- 5. Pressure Rating: 175 psig minimum.
- 6. Body Material: Corrosion-resistant metal.
- 7. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
- 8. Caps: Brass, lugged type, with gasket and chain.
- 9. Escutcheon Plate: Rectangular, brass, wall type.
- 10. Outlet: With pipe threads.
- 11. Body Style: Horizontal Square Vertical.
- 12. Number of Inlets: Two Three Four Six.
- 13. Outlet Location: Back Bottom Left side Right side Top.
- 14. Escutcheon Plate Marking: Similar to "AUTO SPKR & STANDPIPE AUTO SPKR."
- 15. Finish: Polished chrome plated Rough brass or bronze Rough chrome plated.
- 16. Outlet Size: NPS 4 NPS 5 NPS 6 NPS 8.

## 2.9 SPRINKLER SPECIALTY PIPE FITTINGS

### A. Branch Outlet Fittings:

- 1. Manufacturers: Subject to compliance with requirements, Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Anvil International, Inc.
  - b. National Fittings, Inc.
  - c. Shurjoint Piping Products.
  - d. Tyco Fire & Building Products LP.

- e. Victaulic Company.
- f.

- 2. Standard: UL 213.
- 3. Pressure Rating: 175 psig minimum 300 psig.
- 4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
- 5. Type: Mechanical-T and -cross fittings.
- 6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
- 7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
- 8. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. AGF Manufacturing Inc.
  - b. Reliable Automatic Sprinkler Co., Inc.
  - c. Tyco Fire & Building Products LP.
  - d. Victaulic Company.
- 2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
- 3. Pressure Rating: 175 psig minimum 300 psig.
- 4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
- 5. Size: Same as connected piping.
- 6. Inlet and Outlet: Threaded.

C. Branch Line Testers:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Elkhart Brass Mfg. Company, Inc.
  - b. Fire-End & Croker Corporation.
  - c. Potter Roemer.
  - d.
- 2. Standard: UL 199.
- 3. Pressure Rating: 175 psig.
- 4. Body Material: Brass.
- 5. Size: Same as connected piping.
- 6. Inlet: Threaded.
- 7. Drain Outlet: Threaded and capped.
- 8. Branch Outlet: Threaded, for sprinkler.

D. Sprinkler Inspector's Test Fittings:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. AGF Manufacturing Inc.
  - b. Triple R Specialty.
  - c. Tyco Fire & Building Products LP.
  - d. Victaulic Company.
  - e. Viking Corporation.
2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
  3. Pressure Rating: 175 psig minimum 300 psig.
  4. Body Material: Cast- or ductile-iron housing with sight glass.
  5. Size: Same as connected piping.
  6. Inlet and Outlet: Threaded.

E. Adjustable Drop Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. CECA, LLC.
  - b. Corcoran Piping System Co.
  - c. Merit Manufacturing; a division of Anvil International, Inc.
2. Standard: UL 1474.
3. Pressure Rating: 250 psig minimum 300 psig.
4. Body Material: Steel pipe with EPDM-rubber O-ring seals.
5. Size: Same as connected piping.
6. Length: Adjustable.
7. Inlet and Outlet: Threaded.

2.10 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFAC Inc.
2. Globe Fire Sprinkler Corporation.
3. Reliable Automatic Sprinkler Co., Inc.
4. Tyco Fire & Building Products LP.
5. Venus Fire Protection Ltd.
6. Victaulic Company.
7. Viking Corporation.

B. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Residential Sprinklers: 175 psig maximum.
3. Pressure Rating for Automatic Sprinklers: 175 psig minimum.
4. Pressure Rating for High-Pressure Automatic Sprinklers: 250 psig minimum 300 psig.

C. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.

3. Residential Applications: UL 1626.
  4. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
- D. Open Sprinklers with Heat-Responsive Element Removed: UL 199.
1. Characteristics:
    - a. Nominal 1/2-inch Orifice: With Discharge Coefficient K between 5.3 and 5.8.
    - b. Nominal 17/32-inch Orifice: With Discharge Coefficient K between 7.4 and 8.2.
- E. Sprinkler Finishes:
1. Chrome plated.
  2. Bronze.
  3. Painted.
- F. Special Coatings:
1. Wax.
  2. Lead.
  3. Corrosion-resistant paint.
- G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
1. Ceiling Mounting: Chrome-plated steel, one piece, flat Chrome-plated steel, two piece, with 1-inch vertical adjustment Plastic, white finish, one piece, flat.
  2. Sidewall Mounting: Chrome-plated steel Plastic, white finish, one piece, flat.
- H. Sprinkler Guards:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Reliable Automatic Sprinkler Co., Inc.
    - b. Tyco Fire & Building Products LP.
    - c. Victaulic Company.
    - d. Viking Corporation.
  2. Standard: UL 199.
  3. Type: Wire cage with fastening device for attaching to sprinkler.
- 2.11 ALARM DEVICES
- A. Alarm-device types shall match piping and equipment connections.
- B. Water-Motor-Operated Alarm:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Globe Fire Sprinkler Corporation.
- b. Tyco Fire & Building Products LP.
- c. Victaulic Company.
- d. Viking Corporation.

2. Standard: UL 753.
3. Type: Mechanically operated, with Pelton wheel.
4. Alarm Gong: Cast aluminum with red-enamel factory finish.
5. Size: 10-inch diameter.
6. Components: Shaft length, bearings, and sleeve to suit wall construction.
7. Inlet: NPS 3/4.
8. Outlet: NPS 1 drain connection.

C. Electrically Operated Alarm Bell:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Fire-Lite Alarms, Inc.; a Honeywell company.
  - b. Notifier; a Honeywell company.
  - c. Potter Electric Signal Company.
2. Standard: UL 464.
3. Type: Vibrating, metal alarm bell.
4. Size: 6-inch minimum- 8-inch minimum- 10-inch diameter.
5. Finish: Red-enamel factory finish, suitable for outdoor use.

D. Water-Flow Indicators:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. ADT Security Services, Inc.
  - b. McDonnell & Miller; ITT Industries.
  - c. Potter Electric Signal Company.
  - d. System Sensor; a Honeywell company.
  - e. Viking Corporation.
  - f. Watts Industries (Canada) Inc.
2. Standard: UL 346.
3. Water-Flow Detector: Electrically supervised.
4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
5. Type: Paddle operated.
6. Pressure Rating: 250 psig.
7. Design Installation: Horizontal or vertical.

E. Pressure Switches:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. AFAC Inc.
  - b. Barksdale, Inc.
  - c. Detroit Switch, Inc.
  - d. Potter Electric Signal Company.
  - e. System Sensor; a Honeywell company.
  - f. Tyco Fire & Building Products LP.
  - g. United Electric Controls Co.
  - h. Viking Corporation.
  - i.
2. Standard: UL 346.
3. Type: Electrically supervised water-flow switch with retard feature.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design Operation: Rising pressure signals water flow.

F. Valve Supervisory Switches:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Fire-Lite Alarms, Inc.; a Honeywell company.
  - b. Kennedy Valve; a division of McWane, Inc.
  - c. Potter Electric Signal Company.
  - d. System Sensor; a Honeywell company.
2. Standard: UL 346.
3. Type: Electrically supervised.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design: Signals that controlled valve is in other than fully open position.

2.12 CONTROL PANELS

- A. Description: Single-area, two-area, or single-area cross-zoned control panel as indicated, including NEMA ICS 6, Type 1 enclosure, detector, alarm, and solenoid-valve circuitry for operation of deluge valves. Panels contain power supply; battery charger; standby batteries; field-wiring terminal strip; electrically supervised solenoid valves and polarized fire-alarm bell; lamp test facility; single-pole, double-throw auxiliary alarm contacts; and rectifier.
1. Panels: UL listed and FM approved when used with thermal detectors and Class A detector circuit wiring. Electrical characteristics are 120-V ac, 60 Hz, with 24-V dc rechargeable batteries.
  2. Manual Control Stations: Electric operation, metal enclosure, labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.
  3. Manual Control Stations: Hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

## 2.13 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. AMETEK; U.S. Gauge Division.
  - 2. Ashcroft, Inc.
  - 3. Brecco Corporation.
  - 4. WIKA Instrument Corporation.
- B. Standard: UL 393.
- C. Dial Size: 3-1/2- to 4-1/2-inch diameter.
- D. Pressure Gage Range: 0 to 250 psig minimum 0 to 300 psig.
- E. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.
- F. Air System Piping Gage: Include retard feature and "AIR" or "AIR/WATER" label on dial face.

## 2.14 ESCUTCHEONS

- A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.
- B. One-Piece, Cast-Brass Escutcheons: Polished chrome-plated or rough-brass finish with set-screws.
- C. One-Piece, Deep-Pattern Escutcheons: Deep-drawn, box-shaped brass with chrome-plated finish.
- D. One-Piece, Stamped-Steel Escutcheons: Chrome-plated finish with set-screw or spring clips.
- E. Split-Casting, Cast-Brass Escutcheons: Polished chrome-plated or rough-brass finish with concealed hinge and set-screw.
- F. Split-Plate, Stamped-Steel Escutcheons: Chrome-plated finish with concealed exposed-rivet hinge, set-screw or spring clips.
- G. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- H. Split-Casting Floor Plates: Cast brass with concealed hinge.

## 2.15 SLEEVES

- A. Cast-Iron Wall Pipe Sleeves: Cast or fabricated of cast iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. Molded-PE Sleeves: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- D. Molded-PVC Sleeves: Permanent, with nailing flange for attaching to wooden forms.

- E. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- F. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, standard weight, zinc coated, plain ends.
- G. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with set-screws.

## 2.16 SLEEVE SEALS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.
  - 3. Metraflex, Inc.
  - 4. Pipeline Seal and Insulator, Inc.
  - 5.
- B. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
  - 1. Sealing Elements: EPDM-rubber or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 2. Pressure Plates: Carbon steel Plastic Stainless steel.
  - 3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating Stainless steel of length required to secure pressure plates to sealing elements.

## 2.17 GROUT

- A. Standard: ASTM C 1107, Grade B, posthardening and volume adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink, and recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

### 3.2 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with The City of New York before deviating from approved working plans.
- B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
- C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.
- D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- H. Install sprinkler piping with drains for complete system drainage.
- I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- J. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- K. Install alarm devices in piping systems.
- L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
- M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.
- N. Pressurize and check preaction sprinkler system piping and air-pressure maintenance devices air compressors.
- O. Fill sprinkler system piping with water.
- P. Install electric heating cables and pipe insulation on sprinkler piping in areas subject to freezing. Comply with requirements for heating cables in Division 21 "Heat Tracing for Fire-Suppression Piping" and for piping insulation in Division 21 Section "Fire-Suppression Systems Insulation."

### 3.3 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.

- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Twist-Locked Joints: Insert plain end of steel pipe into plain-end-pipe fitting. Rotate retainer lugs one-quarter turn or tighten retainer pin.
- I. Steel-Piping, Pressure-Sealed Joints: Join lightwall steel pipe and steel pressure-seal fittings with tools recommended by fitting manufacturer.
- J. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
  - 1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
- K. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- L. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- M. Steel-Piping, Pressure-Sealed Joints: Join Schedule 5 steel pipe and steel pressure-seal fittings with tools recommended by fitting manufacturer.
- N. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.
- O. Copper-Tubing Grooved Joints: Roll rounded-edge groove in end of tube according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- P. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and copper pressure-seal fittings with tools recommended by fitting manufacturer.
- Q. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.

- R. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.
- S. Plastic-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
  2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.

#### 3.4 INSTALLATION OF COVER SYSTEM FOR SPRINKLER PIPING

- A. Install cover system, brackets, and cover components for sprinkler piping according to manufacturer's "Installation Manual" and with NFPA 13 for supports.

#### 3.5 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
  1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
  2. Alarm Valves: Include bypass check valve and retarding chamber drain-line connection.
  3. Deluge Valves: Install in vertical position, in proper direction of flow, and in main supply to deluge system. Install trim sets for drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

#### 3.6 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of narrow dimension of acoustical ceiling panels.
- B. Install dry-type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing.
- C. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

#### 3.7 FIRE-DEPARTMENT CONNECTION INSTALLATION

- A. Install wall-type, fire-department connections.
- B. Install yard-type, fire-department connections in concrete slab support. Comply with requirements for concrete in Division 03 Section "Cast-in-Place Concrete."

1. Install two three <Insert number> protective pipe bollards around on sides of each fire-department connection. Comply with requirements for bollards in Division 05 Section "Metal Fabrications."

C. Install automatic (ball drip) drain valve at each check valve for fire-department connection.

### 3.8 ESCUTCHEON INSTALLATION

A. Install escutcheons for penetrations of walls, ceilings, and floors.

B. Escutcheons for New Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish stamped steel with set-screw stamped steel with set-screw or spring clips stamped steel with spring clips.
3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish One piece or split casting, cast brass with polished chrome-plated finish Split casting, cast brass with polished chrome-plated finish One piece, stamped steel with set-screw One piece or split plate, stamped steel with set-screw Split plate, stamped steel with set-screw.
4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-plated finish cast brass with rough-brass finish stamped steel with set-screw stamped steel with spring clips stamped steel with set-screw or spring clips.
5. Bare Piping in Equipment Rooms: One piece, cast brass stamped steel with set-screw stamped steel with spring clips stamped steel with set-screw or spring clips.
6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

### 3.9 SLEEVE INSTALLATION

- A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.
- B. Sleeves are not required for core-drilled holes.
- C. Permanent sleeves are not required for holes formed by removable PE sleeves.
- D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.
- E. Install sleeves in new partitions, slabs, and walls as they are built.
- F. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements for joint sealants in Division 07 Section "Joint Sealants."
- G. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements for joint sealants in Division 07 Section "Joint Sealants."
- H. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals.
- I. Seal space outside of sleeves in concrete slabs and walls with grout.

- J. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.
- K. Install sleeve materials according to the following applications:
1. Sleeves for Piping Passing through Concrete Floor Slabs: Molded PE Molded PVC Galvanized-steel pipe <Insert type>.
  2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Galvanized-steel pipe Stack sleeve fittings <Insert type>.
    - a. Extend sleeves 2 inches above finished floor level.
    - b. For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Comply with requirements for flashing in Division 07 Section "Sheet Metal Flashing and Trim."
  3. Sleeves for Piping Passing through Gypsum-Board Partitions:
    - a. PVC-pipe Galvanized-steel-pipe sleeves for pipes smaller than NPS 6.
    - b. Galvanized-steel-sheet sleeves for pipes NPS 6 and larger.
    - c. Exception: Sleeves are not required for water-supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.
  4. Sleeves for Piping Passing through Concrete Roof Slabs: Molded PE Molded PVC Galvanized-steel pipe.
  5. Sleeves for Piping Passing through Exterior Concrete Walls:
    - a. Galvanized-steel-pipe sleeves for pipes smaller than NPS 6.
    - b. Cast-iron wall-pipe sleeves for pipes NPS 6 and larger.
    - c. Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.
  6. Sleeves for Piping Passing through Interior Concrete Walls:
    - a. PVC-pipe Galvanized-steel-pipe sleeves for pipes smaller than NPS 6.
    - b. Galvanized-steel-sheet sleeves for pipes NPS 6 and larger.
- L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestop materials and installations in Division 07 Section "Penetration Firestopping."

### 3.10 SLEEVE SEAL INSTALLATION

- A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.
- B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.11 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

### 3.12 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  - 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
  - 4. Energize circuits to electrical equipment and devices.
  - 5. Start and run excess-pressure pumps.
  - 6. Coordinate with fire-alarm tests. Operate as required.
  - 7. Coordinate with fire-pump tests. Operate as required.
  - 8. Verify that equipment hose threads are same as local fire-department equipment.
- C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.13 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Remove and replace sprinklers with paint other than factory finish.

### 3.14 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Train The City of New York 's maintenance personnel to adjust, operate, and maintain specialty valves and pressure-maintenance pumps.

### 3.15 PIPING SCHEDULE

- A. Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends; cast-iron threaded fittings; and threaded grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.
- B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- C. Standard-pressure, wet-pipe sprinkler system, NPS 2 and smaller, shall be one of the following:
  - 1. Standard-weight or Schedule 30, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

2. Standard-weight or Schedule 30, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. Standard-weight or Schedule 30, black-steel pipe with plain ends; uncoated, plain-end-pipe fittings; and twist-locked joints.
4. Standard-weight or Schedule 30, galvanized-steel pipe with plain ends; galvanized, plain-end-pipe fittings; and twist-locked joints.
5. Standard-weight or Schedule 30, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
6. Standard-weight or Schedule 30, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
7. Standard-weight or Schedule 30, black-steel pipe with plain ends; steel welding fittings; and welded joints.
8. Schedule 5 steel pipe; steel pressure-seal fittings; and pressure-sealed joints.
9. Type L Type M, hard copper tube with plain ends; cast- or wrought-copper solder-joint fittings; and brazed joints.
10. Type L Type M, hard copper tube with plain ends; copper pressure-seal fittings; and pressure-sealed joints.
11. NPS 2, Type L Type M, hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

D. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 to NPS 4 , shall be one of the following:

1. Standard-weight or Schedule 30, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Standard-weight or Schedule 30, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. Standard-weight or Schedule 30, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. Standard-weight or Schedule 30, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
5. Standard-weight or Schedule 30, black-steel pipe with plain ends; steel welding fittings; and welded joints.
6. Type L Type M, hard copper tube with plain ends; cast- or wrought-copper solder-joint fittings; and brazed joints.
7. Type L Type M, hard copper tube with plain ends; copper pressure-seal fittings; and pressure-sealed joints.
8. Type L Type M, hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

E. Standard-pressure, wet-pipe sprinkler system, NPS 5 and larger , shall be one of the following:

1. Standard-weight or Schedule 30, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Standard-weight or Schedule 30, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. Standard-weight or Schedule 30, black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. Standard-weight or Schedule 30, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

5. Standard-weight or Schedule 30, black-steel pipe with plain ends; steel welding fittings; and welded joints.
6. Type L Type M, hard copper tube with plain ends; cast- or wrought-copper solder-joint fittings; and brazed joints.
7. Type L Type M, hard copper tube with roll-grooved ends; copper, grooved-end fittings; grooved-end-tube couplings; and grooved joints.

### 3.16 SPRINKLER SCHEDULE

- A. Use sprinkler types in subparagraphs below for the following applications:
  1. Rooms without Ceilings: Upright sprinklers.
  2. Rooms with Suspended Ceilings: Pendent sprinklers Recessed sprinklers Flush sprinklers Concealed sprinklers Pendent, recessed, flush, and concealed sprinklers as indicated.
  3. Wall Mounting: Sidewall sprinklers.
  4. Spaces Subject to Freezing: Upright sprinklers Pendent, dry sprinklers Sidewall, dry sprinklers Upright, pendent, dry sprinklers; and sidewall, dry sprinklers as indicated.
  5. Special Applications: Extended-coverage, flow-control, and quick-response sprinklers where indicated .
- B. Provide sprinkler types in subparagraphs below with finishes indicated.
  1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
  2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
  3. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
  4. Residential Sprinklers: Dull chrome.
  5. Upright Pendent and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

END OF SECTION 211313

## SECTION 220500

### COMMON WORK RESULTS FOR PLUMBING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. Plumbing demolition.
9. Equipment installation requirements common to equipment sections.
10. Painting and finishing.
11. Concrete bases.
12. Supports and anchorages.

##### 1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
  1. ABS: Acrylonitrile-butadiene-styrene plastic.
  2. CPVC: Chlorinated polyvinyl chloride plastic.
  3. PE: Polyethylene plastic.
  4. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

#### 1.4 SUBMITTALS

A. Product Data: For the following:

1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates.

#### 1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

#### 1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

### 2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

### 2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

### 2.4 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

1. Manufacturers:
    - a. Cascade Waterworks Mfg. Co.
    - b. Dresser Industries, Inc.; DMD Div.
    - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
    - d. JCM Industries.
    - e. Smith-Blair, Inc.
    - f. Viking Johnson.
  2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
  3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
  4. Aboveground Pressure Piping: Pipe fitting.
- B. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
1. Manufacturers:
    - a. Cascade Waterworks Mfg. Co.
    - b. Fernco, Inc.
    - c. Mission Rubber Company.
    - d. Plastic Oddities, Inc.

## 2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
  1. Manufacturers:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Company.
    - c. Eclipse, Inc.
    - d. Epco Sales, Inc.
    - e. Hart Industries, International, Inc.
    - f. Watts Industries, Inc.; Water Products Div.
    - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
  1. Manufacturers:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Company.
    - c. Epco Sales, Inc.
    - d. Watts Industries, Inc.; Water Products Div.

- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
1. Manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Central Plastics Company.
    - d. Pipeline Seal and Insulator, Inc.
  2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
    - a. Calpico, Inc.
    - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
    - a. Perfection Corp.
    - b. Precision Plumbing Products, Inc.
    - c. Sioux Chief Manufacturing Co., Inc.
    - d. Victaulic Co. of America.

## 2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
1. Manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.
  2. Sealing Elements: EPDM NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  3. Pressure Plates: Plastic Carbon steel Stainless steel. Include two for each sealing element.
  4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

## 2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
  - 1. Finish: Polished chrome-plated Rough brass Polished chrome-plated and rough brass.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
  - 1. Finish: Polished chrome-plated Rough brass Polished chrome-plated and rough brass.
- E. One-Piece, Stamped-Steel Type: With set screw spring clips set screw or spring clips and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed exposed-rivet hinge, set screw spring clips set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

## 2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.

2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

### PART 3 - EXECUTION

#### 3.1 PLUMBING DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
  1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
  3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to The City of New York .
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

#### 3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.

- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
  - 1. New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
    - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece Split-casting One-piece or split-casting, cast-brass type with polished chrome-plated finish.
    - g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type Split-plate, stamped-steel type with concealed hinge One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge and set screw.
    - h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated rough-brass finish.
    - i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed exposed-rivet concealed or exposed-rivet hinge and set screw spring clips set screw or spring clips.
    - j. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
    - k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw spring clips set screw or spring clips.
    - l. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
    - a. PVC Steel Pipe Sleeves: For pipes smaller than NPS 6.

- b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
  - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
    - 1) Seal space outside of sleeve fittings with grout.
4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
  - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
  - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### 3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
  - 1. Plain-End Pipe and Fittings: Use butt fusion.
  - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- J. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

### 3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
  - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
  - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

### 3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

- D. Install equipment to allow right of way for piping installed at required slope.

### 3.6 PAINTING

- A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### 3.7 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
  - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
  - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
  - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
  - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
  - 7. Use 3000-psi , 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete Miscellaneous Cast-in-Place Concrete."

### 3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

### 3.9 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

### 3.10 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.

- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 220500

## SECTION 220516

### EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Metal-bellows expansion joints.
  - 2. Rubber expansion joints.
  - 3. Flexible-hose expansion joints.
  - 4. Pipe bends and loops.
  - 5. Alignment guides and anchors.

##### 1.3 DEFINITIONS

- A. BR: Butyl rubber.
- B. Buna-N: Nitrile rubber.
- C. CR: Chlorosulfonated polyethylene synthetic rubber.
- D. CSM: Chlorosulfonyl-polyethylene rubber.
- E. EPDM: Ethylene-propylene-diene terpolymer rubber.
- F. NR: Natural rubber.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Compatibility: Products shall be suitable for piping system fluids, materials, working pressures, and temperatures.
- B. Capability: Products shall absorb 200 percent of maximum axial movement between anchors.

##### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Delegated-Design Submittal: For each anchor and alignment guide indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Design Calculations: Calculate requirements for thermal expansion of piping systems and for selecting and designing expansion joints, loops, and bends.

2. Anchor Details: Detail fabrication of each anchor indicated. Show dimensions and methods of assembly and attachment to building structure.
3. Alignment Guide Details: Detail field assembly and attachment to building structure.
4. Schedule: Indicate type, manufacturer's number, size, material, pressure rating, end connections, and location for each expansion joint.

C. Welding certificates.

D. Product Certificates: For each type of pipe expansion joint, signed by product manufacturer.

E. Maintenance Data: For pipe expansion joints to include in maintenance manuals.

## 1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. Steel Shapes and Plates: AWS D1.1, "Structural Welding Code - Steel."
2. Welding to Piping: ASME Boiler and Pressure Vessel Code: Section IX.

## PART 2 - PRODUCTS

### 2.1 EXPANSION JOINTS

A. Metal-Bellows Expansion Joints: ASTM F 1120, circular-corrugated-bellows type with external tie rods.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

- a. Adscos Manufacturing, LLC.
- b. Anamet, Inc.
- c. Badger Industries.
- d. Expansion Joint Systems, Inc.
- e. Flex-Hose Co., Inc.
- f. Flexicraft Industries.
- g. Flex-Pression, Ltd.
- h. Flex-Weld, Inc.
- i. Hyspan Precision Products, Inc.
- j. Metraflex, Inc.
- k. Piping Technology & Products, Inc.
- l. Proco Products, Inc.
- m. Senior Flexonics, Inc.; Pathway Division.
- n. Tozen America Corp.
- o. Unaflex Inc.
- p. WahlcoMetroflex.

3. Metal-Bellows Expansion Joints for Copper Piping: Single Single- or multiple Multiple-ply phosphor-bronze bellows, copper pipe end connections, and brass shrouds.
4. Metal-Bellows Expansion Joints for Stainless-Steel Waterway: Single-ply stainless-steel bellows, stainless-steel-pipe end connections, and steel shroud.

5. Metal-Bellows Expansion Joints for Steel Piping: Single Single- or multiple Multiple-ply stainless-steel bellows, steel pipe end connections, and carbon-steel shroud.
6. Minimum Pressure Rating: 150 psig 175 psig <Insert measurement>, unless otherwise indicated.
7. Configuration: Single Single- or double Double-bellows type with base, unless otherwise indicated.
8. End Connections: Flanged Flanged or weld Weld.

B. Rubber Expansion Joints: ASTM F 1123, fabric-reinforced rubber with external control rods and complying with FSA's "Technical Handbook: Non-Metallic Expansion Joints and Flexible Pipe Connectors."

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Flex-Hose Co., Inc.
  - b. Flexicraft Industries.
  - c. Flex-Weld, Inc.
  - d. Garlock Sealing Technologies.
  - e. General Rubber Corp.
  - f. Mason Industries, Inc.; Mercer Rubber Co.
  - g. Metraflex, Inc.
  - h. MG Piping Products Co.
  - i. Proco Products, Inc.
  - j. Red Valve Company, Inc.
  - k. Senior Flexonics, Inc.; Pathway Division.
  - l. Tozen America Corp.
  - m. Unaflex Inc.
  - n. Vibration Mountings & Controls, Inc.
3. Arch Type: Single Single or multiple Multiple arches.
4. Spherical Type: Single Single or multiple Multiple spheres.
  - a. Minimum Pressure and Temperature Ratings for NPS 1-1/2 to NPS 4: 150 psig at 220 deg F .
  - b. Minimum Pressure and Temperature Ratings for NPS 5 and NPS 6: 140 psig at 200 deg F .
  - c. Minimum Pressure and Temperature Ratings for NPS 8 to NPS 12: 140 psig at 180 deg F .
5. Material: BR Buna-N CR CSM EPDM NR.
6. End Connections: Full-faced, integral, steel flanges with steel retaining rings.

C. Flexible-Hose Expansion Joints: Manufactured assembly with two flexible-metal-hose legs joined by long-radius, 180-degree return bend or center section of flexible hose; with inlet and outlet elbow fittings, corrugated-metal inner hoses, and braided outer sheaths.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

- a. Flex-Hose Co., Inc.
  - b. Flexicraft Industries.
  - c. Flex-Pression, Ltd.
  - d. Metraflex, Inc.
3. Flexible-Hose Expansion Joints for Copper Piping: Copper-alloy fittings with solder- joint end connections.
    - a. NPS 2 and Smaller: Bronze hoses and single-braid bronze sheaths with 450 psig at 70 deg F and 340 psig at 450 deg F ratings.
    - b. NPS 2-1/2 to NPS 4: Stainless-steel hoses and single-braid, stainless-steel sheaths with 300 psig at 70 deg F and 225 psig at 450 deg F ratings.
  4. Flexible-Hose Expansion Joints for Copper Piping: Copper-alloy fittings with solder- joint end connections.
    - a. NPS 2 and Smaller: Bronze hoses and double-braid bronze sheaths with 700 psig at 70 deg F and 500 psig at 450 deg F ratings.
    - b. NPS 2-1/2 to NPS 4: Stainless-steel hoses and double-braid, stainless-steel sheaths with 420 psig at 70 deg F and 315 psig at 450 deg F ratings.
  5. Flexible-Hose Expansion Joints for Steel Piping: Carbon-steel fittings with threaded end connections for NPS 2 and smaller and flanged weld end connections for NPS 2-1/2 and larger.
    - a. NPS 2 and Smaller: Stainless-steel hoses and single-braid, stainless-steel sheaths with 450 psig at 70 deg F and 325 psig at 600 deg F ratings.
    - b. NPS 2-1/2 to NPS 6: Stainless-steel hoses and single-braid, stainless-steel sheaths with 200 psig at 70 deg F and 145 psig at 600 deg F ratings.
    - c. NPS 8 to NPS 12: Stainless-steel hoses and single-braid, stainless-steel sheaths with 125 psig at 70 deg F and 90 psig at 600 deg F ratings.
  6. Flexible-Hose Expansion Joints for Steel Piping: Carbon-steel fittings with threaded end connections for NPS 2 and smaller and flanged weld end connections for NPS 2-1/2 and larger.
    - a. NPS 2 and Smaller: Stainless-steel hoses and double-braid, stainless-steel sheaths with 700 psig at 70 deg F and 515 psig at 600 deg F ratings.
    - b. NPS 2-1/2 to NPS 6: Stainless-steel hoses and double-braid, stainless-steel sheaths with 275 psig at 70 deg F and 200 psig at 600 deg F ratings.
    - c. NPS 8 and Larger: Stainless-steel hoses and double-braid, stainless-steel sheaths with 165 psig at 70 deg F and 120 psig at 600 deg F ratings.

## 2.2 ALIGNMENT GUIDES

- A. Description: Steel, factory fabricated, with bolted two-section outer cylinder and base for alignment of piping and two-section guiding spider for bolting to pipe.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. Adscos Manufacturing, LLC.

- b. Advanced Thermal Systems, Inc.
- c. Flex-Hose Co., Inc.
- d. Flexicraft Industries.
- e. Flex-Weld, Inc.
- f. Hyspan Precision Products, Inc.
- g. Metraflex, Inc.
- h. Piping Technology & Products, Inc.
- i. Senior Flexonics, Inc.; Pathway Division.

## 2.3 MATERIALS FOR ANCHORS

- A. Steel Shapes and Plates: ASTM A 36/A 36M.
- B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex head.
- C. Washers: ASTM F 844, steel, plain, flat washers.
- D. Mechanical Fasteners: Insert-wedge-type stud with expansion plug anchor for use in hardened portland cement concrete, and tension and shear capacities appropriate for application.
  - 1. Stud: Threaded, zinc-coated carbon steel.
  - 2. Expansion Plug: Zinc-coated steel.
  - 3. Washer and Nut: Zinc-coated steel.
- E. Chemical Fasteners: Insert-type-stud bonding system anchor for use with hardened portland cement concrete, and tension and shear capacities appropriate for application.
  - 1. Bonding Material: ASTM C 881, Type IV, Grade 3, 2-component epoxy resin suitable for surface temperature of hardened concrete where fastener is to be installed.
  - 2. Stud: ASTM A 307, zinc-coated carbon steel with continuous thread on stud, unless otherwise indicated.
  - 3. Washer and Nut: Zinc-coated steel.
- F. Concrete: Portland cement mix, 3000 psi minimum. Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for formwork, reinforcement, and concrete.
- G. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink, nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

## PART 3 - EXECUTION

### 3.1 EXPANSION-JOINT INSTALLATION

- A. Install manufactured, nonmetallic expansion joints according to FSA's "Technical Handbook: Non-Metallic Expansion Joints and Flexible Pipe Connectors."
- B. Install expansion joints of sizes matching size of piping in which they are installed.
- C. Install alignment guides to allow expansion and to avoid end-loading and torsional stress.

### 3.2 PIPE BEND AND LOOP INSTALLATION

- A. Install pipe bends and loops cold-sprung in tension or compression as required to partly absorb tension or compression produced during anticipated change in temperature.
- B. Attach pipe bends and loops to anchors.
  - 1. Steel Anchors: Attach by welding. Comply with ASME B31.9 and ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
  - 2. Concrete Anchors: Attach by fasteners. Follow fastener manufacturer's written instructions.

### 3.3 SWING CONNECTIONS

- A. Connect risers and branch connections to mains with at least five <Insert number> pipe fittings, including tee in main.
- B. Connect risers and branch connections to terminal units with at least four <Insert number> pipe fittings, including tee in riser.
- C. Connect mains and branch connections to terminal units with at least four <Insert number> pipe fittings, including tee in main.

### 3.4 ALIGNMENT-GUIDE INSTALLATION

- A. Install guides on piping adjoining pipe expansion fittings and loops.
- B. Attach guides to pipe and secure to building structure.

### 3.5 ANCHOR INSTALLATION

- A. Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.
- B. Fabricate and install steel anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B31.9 and AWS D1.1.
- C. Construct concrete anchors of poured-in-place concrete of dimensions indicated and include embedded fasteners.
- D. Install pipe anchors according to expansion-joint manufacturer's written instructions if expansion joints are indicated.
- E. Use grout to form flat bearing surfaces for expansion fittings, guides, and anchors installed on or in concrete.

END OF SECTION 220516

## SECTION 220519

### METERS AND GAGES FOR PLUMBING PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Gages.
  - 2. Test plugs.
- B. Related Sections:
  - 1. Division 22 Section "Facility Water Distribution Piping" for domestic and fire-protection water service meters outside the building.
  - 2. Division 22 Section "Domestic Water Piping" for domestic and fire-protection water service meters inside the building.
  - 3. Division 23 Section "Facility Natural-Gas Piping" for gas meters.

##### 1.3 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated; include performance curves.
- B. Shop Drawings: Schedule for thermometers and gages indicating manufacturer's number, scale range, and location for each.
- C. Product Certificates: For each type of thermometer and gage, signed by product manufacturer.

#### PART 2 - PRODUCTS

##### 2.1 PRESSURE GAGES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - 1. AMETEK, Inc.; U.S. Gauge Div.
  - 2. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.

3. Ernst Gage Co.
4. Eugene Ernst Products Co.
5. KOBOLD Instruments, Inc.
6. Marsh Bellofram.
7. Miljoco Corp.
8. Noshok, Inc.
9. Palmer - Wahl Instruments Inc.
10. REO TEMP Instrument Corporation.
11. Trevice, H. O. Co.
12. Weiss Instruments, Inc.
13. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
14. WIKA Instrument Corporation.
15. Winters Instruments.

C. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.

1. Case: Dry Liquid-filled type, drawn steel or cast aluminum metal or plastic plastic, 4-1/2-inch 6-inch diameter.
2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
4. Movement: Mechanical, with link to pressure element and connection to pointer.
5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
6. Pointer: Red or other dark-color metal.
7. Window: Glass Glass or plastic Plastic .
8. Ring: Metal Brass Stainless steel Metal or plastic Plastic.
9. Accuracy: Grade A, plus or minus 1 percent of middle half B, plus or minus 2 percent of middle half C, plus or minus 3 percent of middle half D, plus or minus 5 percent of whole scale.
10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
11. Range for Fluids under Pressure: Two times operating pressure.

D. Remote-Mounting, Dial-Type Pressure Gages: ASME B40.100, indicating-dial type.

1. Case: Dry type, drawn steel or cast aluminum, 4-1/2-inch 6-inch diameter with holes for panel mounting.
2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
4. Movement: Mechanical, with link to pressure element and connection to pointer.
5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
6. Pointer: Red or other dark-color metal.
7. Window: Glass Glass or plastic Plastic .
8. Ring: Metal Brass Stainless steel Metal or plastic Plastic.
9. Accuracy: Grade A, plus or minus 1 percent of middle half B, plus or minus 2 percent of middle half C, plus or minus 3 percent of middle half D, plus or minus 5 percent of whole scale.
10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
11. Range for Fluids under Pressure: Two times operating pressure.

E. Pressure-Gage Fittings:

1. Valves: NPS 1/4 brass or stainless-steel needle type.
2. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

## 2.2 TEST PLUGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - 1. Flow Design, Inc.
  - 2. MG Piping Products Co.
  - 3. National Meter, Inc.
  - 4. Peterson Equipment Co., Inc.
  - 5. Sisco Manufacturing Co.
  - 6. Trerice, H. O. Co.
  - 7. Watts Industries, Inc.; Water Products Div.
  - 8.
- C. Description: Corrosion-resistant brass or stainless-steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.
- D. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F .
- E. Core Inserts: One or two self-sealing rubber valves.
  - 1. Insert material for water service at 20 to 200 deg F shall be CR.
  - 2. Insert material for water service at minus 30 to plus 275 deg F shall be EPDM.
- F. Test Kit: Furnish one test kit(s) containing one pressure gage and adaptor, one two thermometer(s), and carrying case. Pressure gage, adapter probes, and thermometer sensing elements shall be of diameter to fit test plugs and of length to project into piping.
  - 1. Pressure Gage: Small bourdon-tube insertion type with 2- to 3-inch- diameter dial and probe. Dial range shall be 0 to 200 psig .
  - 2. Low-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch- diameter dial and tapered-end sensing element. Dial ranges shall be 25 to 125 deg F .
  - 3. High-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch- diameter dial and tapered-end sensing element. Dial ranges shall be 0 to 220 deg F .
  - 4. Carrying case shall have formed instrument padding.

## PART 3 - EXECUTION

### 3.1 THERMOMETER APPLICATIONS

- A. Install liquid-in-glass direct-mounting, vapor-actuated dial remote-mounting, vapor-actuated dial bimetallic-actuated dial thermometers in the outlet of each domestic, hot-water storage tank.
- B. Install dry liquid-filled-case-type, vapor bimetallic-actuated dial thermometers at suction and discharge of each pump.
- C. Provide the following temperature ranges for thermometers:
  - 1. Domestic Hot Water: 30 to 180 deg F, with 2-degree scale divisions 30 to 240 deg F, with 2-degree scale divisions .

2. Domestic Cold Water: 0 to 100 deg F, with 2-degree scale divisions 30 to 130 deg F, with 2-degree scale divisions .

### 3.2 GAGE APPLICATIONS

- A. Install dry-case-type pressure gages for discharge of each pressure-reducing valve.
- B. Install dry liquid-filled-case-type pressure gages at suction and discharge of each pump.

### 3.3 INSTALLATIONS

- A. Install direct-mounting thermometers and adjust vertical and tilted positions.
- B. Install remote-mounting dial thermometers on panel, with tubing connecting panel and thermometer bulb supported to prevent kinks. Use minimum tubing length.
- C. Install thermowells with socket extending a minimum of 2 inches into fluid one-third of diameter of pipe to center of pipe and in vertical position in piping tees where thermometers are indicated.
- D. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.
- E. Install remote-mounting pressure gages on panel.
- F. Install needle-valve and snubber fitting in piping for each pressure gage.
- G. Install test plugs in tees in piping.
- H. Install permanent indicators on walls or brackets in accessible and readable positions.
- I. Install connection fittings for attachment to portable indicators in accessible locations.
- J. Install thermometers and gages adjacent to machines and equipment to allow service and maintenance for thermometers, gages, machines, and equipment.
- K. Adjust faces of thermometers and gages to proper angle for best visibility.

END OF SECTION 220519

## SECTION 220523

### GENERAL-DUTY VALVES FOR PLUMBING PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

1. Bronze angle valves.
2. Brass ball valves.
3. Bronze ball valves.
4. Iron ball valves.
5. Iron, single-flange butterfly valves.
6. Iron, grooved-end butterfly valves.
7. Bronze lift check valves.
8. Bronze swing check valves.
9. Iron swing check valves.
10. Iron swing check valves with closure control.
11. Iron, grooved-end swing check valves.
12. Iron, center-guided check valves.
13. Iron, plate-type check valves.
14. Bronze gate valves.
15. Iron gate valves.
16. Bronze globe valves.
17. Iron globe valves.
18. Lubricated plug valves.
19. Chainwheels.

- B. Related Sections:

1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
2. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

##### 1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, grooves, and weld ends.
  - 3. Set angle, gate, and globe valves closed to prevent rattling.
  - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
  - 5. Set butterfly valves closed or slightly open.
  - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

### PART 2 - PRODUCTS

#### 2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.

- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
  - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
  - 2. Handwheel: For valves other than quarter-turn types.
  - 3. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.
  - 4. Wrench: For plug valves with square heads. Furnish the City of New York with 1 wrench for every 5 10 plug valves, for each size square plug-valve head.
  - 5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
  - 1. Gate Valves: With rising stem.
  - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  - 3. Butterfly Valves: With extended neck.
- F. Valve-End Connections:
  - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
  - 2. Grooved: With grooves according to AWWA C606.
  - 3. Solder Joint: With sockets according to ASME B16.18.
  - 4. Threaded: With threads according to ASME B1.20.1.
- G. Valve Bypass and Drain Connections: MSS SP-45.

## 2.2 BRONZE ANGLE VALVES

- A. Class 125, Bronze Angle Valves with Bronze Disc:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Hammond Valve.
    - b. Milwaukee Valve Company.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 1.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    - d. Ends: Threaded.
    - e. Stem and Disc: Bronze.
    - f. Packing: Asbestos free.
    - g. Handwheel: Malleable iron, bronze, or aluminum.
- B. Class 125, Bronze Angle Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. American Valve, Inc.
    - b. NIBCO INC.
  2. Description:
    - a. Standard: MSS SP-80, Type 2.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    - d. Ends: Threaded.
    - e. Stem: Bronze.
    - f. Disc: PTFE or TFE.
    - g. Packing: Asbestos free.
    - h. Handwheel: Malleable iron, bronze, or aluminum.
- C. Class 150, Bronze Angle Valves with Bronze Disc:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Crane Co.; Crane Valve Group; Stockham Division.
    - b. Kitz Corporation.
  2. Description:
    - a. Standard: MSS SP-80, Type 1.
    - b. CWP Rating: 300 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
    - d. Ends: Threaded.
    - e. Stem and Disc: Bronze.
    - f. Packing: Asbestos free.
    - g. Handwheel: Malleable iron, bronze, or aluminum.
- D. Class 150, Bronze Angle Valves with Nonmetallic Disc:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Crane Co.; Crane Valve Group; Stockham Division.
    - d. Hammond Valve.
    - e. Milwaukee Valve Company.
    - f. NIBCO INC.
    - g. Powell Valves.
  2. Description:
    - a. Standard: MSS SP-80, Type 2.
    - b. CWP Rating: 300 psig.

- c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
- d. Ends: Threaded.
- e. Stem: Bronze.
- f. Disc: PTFE or TFE.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

## 2.3 BRASS BALL VALVES

### A. One-Piece, Reduced-Port, Brass Ball Valves with Brass Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Kitz Corporation.
  - b. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
  - a. Standard: MSS SP-110.
  - b. CWP Rating: 400 psig.
  - c. Body Design: One piece.
  - d. Body Material: Forged brass.
  - e. Ends: Threaded.
  - f. Seats: PTFE or TFE.
  - g. Stem: Brass.
  - h. Ball: Chrome-plated brass.
  - i. Port: Reduced.

### B. Two-Piece, Full-Port, Brass Ball Valves with Brass Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Crane Co.; Crane Valve Group; Crane Valves.
  - b. Crane Co.; Crane Valve Group; Jenkins Valves.
  - c. DynaQuip Controls.
  - d. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
  - e. Hammond Valve.
  - f. Jamesbury; a subsidiary of Metso Automation.
  - g. Jomar International, LTD.
  - h. Kitz Corporation.
  - i. Legend Valve.
  - j. Marwin Valve; a division of Richards Industries.
  - k. Milwaukee Valve Company.
  - l. NIBCO INC.
  - m. Red-White Valve Corporation.
  - n. RuB Inc.
2. Description:
  - a. Standard: MSS SP-110.

- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Brass.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

C. Two-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
- d. Hammond Valve.
- e. Jamesbury; a subsidiary of Metso Automation.
- f. Kitz Corporation.
- g. Marwin Valve; a division of Richards Industries.
- h. Milwaukee Valve Company.
- i. RuB Inc.
- j.

- 2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

D. Two-Piece, Regular-Port, Brass Ball Valves with Brass Trim:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Hammond Valve.
- b. Jamesbury; a subsidiary of Metso Automation.
- c. Legend Valve.
- d. Marwin Valve; a division of Richards Industries.
- e. Milwaukee Valve Company.

- 2. Description:

- a. Standard: MSS SP-110.

- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Brass.
- i. Ball: Chrome-plated brass.
- j. Port: Regular.

E. Two-Piece, Regular-Port, Brass Ball Valves with Stainless-Steel Trim:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Jamesbury; a subsidiary of Metso Automation.
- b. Marwin Valve; a division of Richards Industries.

- 2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Brass or bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Regular.

F. Three-Piece, Full-Port, Brass Ball Valves with Brass Trim:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Jomar International, LTD.
- b. Kitz Corporation.
- c. Red-White Valve Corporation.
- d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

- 2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Three piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Brass.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

G. Three-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Jomar International, LTD.
  - b. Kitz Corporation.
  - c. Marwin Valve; a division of Richards Industries.
  - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
  - a. Standard: MSS SP-110.
  - b. SWP Rating: 150 psig.
  - c. CWP Rating: 600 psig.
  - d. Body Design: Three piece.
  - e. Body Material: Forged brass.
  - f. Ends: Threaded.
  - g. Seats: PTFE or TFE.
  - h. Stem: Stainless steel.
  - i. Ball: Stainless steel, vented.
  - j. Port: Full.

2.4 BRONZE BALL VALVES

A. One-Piece, Reduced-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. American Valve, Inc.
  - b. Conbraco Industries, Inc.; Apollo Valves.
  - c. NIBCO INC.
2. Description:
  - a. Standard: MSS SP-110.
  - b. CWP Rating: 400 psig.
  - c. Body Design: One piece.
  - d. Body Material: Bronze.
  - e. Ends: Threaded.
  - f. Seats: PTFE or TFE.
  - g. Stem: Bronze.
  - h. Ball: Chrome-plated brass.
  - i. Port: Reduced.

B. One-Piece, Reduced-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Conbraco Industries, Inc.; Apollo Valves.
- b. NIBCO INC.
- c. American Valve, Inc.

2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig.
- c. Body Design: One piece.
- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE or TFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Reduced.

C. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. American Valve, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Crane Co.; Crane Valve Group; Crane Valves.
- d. Hammond Valve.
- e. Lance Valves; a division of Advanced Thermal Systems, Inc.
- f. Legend Valve.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Red-White Valve Corporation.
- j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

D. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Conbraco Industries, Inc.; Apollo Valves.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Hammond Valve.

- d. Lance Valves; a division of Advanced Thermal Systems, Inc.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

E. Two-Piece, Regular-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. American Valve, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. DynaQuip Controls.
- f. Hammond Valve.
- g. Lance Valves; a division of Advanced Thermal Systems, Inc.
- h. Milwaukee Valve Company.
- i. NIBCO INC.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Regular.

F. Two-Piece, Regular-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Conbraco Industries, Inc.; Apollo Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.

- c. Hammond Valve.
- d. Milwaukee Valve Company.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Regular.

G. Three-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Conbraco Industries, Inc.; Apollo Valves.
- b. DynaQuip Controls.
- c. Hammond Valve.
- d. Milwaukee Valve Company.
- e. NIBCO INC.
- f. Red-White Valve Corporation.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Three piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

H. Three-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Conbraco Industries, Inc.; Apollo Valves.
- b. Hammond Valve.
- c. Milwaukee Valve Company.
- d. NIBCO INC.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Three piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

## 2.5 IRON BALL VALVES

### A. Class 125, Iron Ball Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. American Valve, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Kitz Corporation.
- d. Sure Flow Equipment Inc.
- e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-72.
- b. CWP Rating: 200 psig.
- c. Body Design: Split body.
- d. Body Material: ASTM A 126, gray iron.
- e. Ends: Flanged.
- f. Seats: PTFE or TFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel.
- i. Port: Full.

## 2.6 IRON, SINGLE-FLANGE BUTTERFLY VALVES

### A. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Cooper Cameron Valves; a division of Cooper Cameron Corporation.
- d. Crane Co.; Crane Valve Group; Jenkins Valves.
- e. Crane Co.; Crane Valve Group; Stockham Division.
- f. DeZurik Water Controls.
- g. Flo Fab Inc.
- h. Hammond Valve.

- i. Kitz Corporation.
- j. Legend Valve.
- k. Milwaukee Valve Company.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Red-White Valve Corporation.
- o. Spence Strainers International; a division of CIRCOR International, Inc.
- p. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Aluminum bronze.

B. 200 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Cooper Cameron Valves; a division of Cooper Cameron Corporation.
- d. Crane Co.; Crane Valve Group; Jenkins Valves.
- e. Crane Co.; Crane Valve Group; Stockham Division.
- f. DeZurik Water Controls.
- g. Flo Fab Inc.
- h. Hammond Valve.
- i. Kitz Corporation.
- j. Legend Valve.
- k. Milwaukee Valve Company.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Red-White Valve Corporation.
- o. Spence Strainers International; a division of CIRCOR International, Inc.
- p. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Aluminum bronze.

C. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Ductile-Iron Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
  - b. American Valve, Inc.
  - c. Conbraco Industries, Inc.; Apollo Valves.
  - d. Cooper Cameron Valves; a division of Cooper Cameron Corporation.
  - e. Crane Co.; Crane Valve Group; Center Line.
  - f. Crane Co.; Crane Valve Group; Stockham Division.
  - g. DeZurik Water Controls.
  - h. Flo Fab Inc.
  - i. Hammond Valve.
  - j. Kitz Corporation.
  - k. Legend Valve.
  - l. Milwaukee Valve Company.
  - m. Mueller Steam Specialty; a division of SPX Corporation.
  - n. NIBCO INC.
  - o. Norriseal; a Dover Corporation company.
  - p. Spence Strainers International; a division of CIRCOR International, Inc.
  - q. Sure Flow Equipment Inc.
  - r. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - s.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Nickel-plated or -coated ductile iron.

D. 200 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Ductile-Iron Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
  - b. American Valve, Inc.
  - c. Conbraco Industries, Inc.; Apollo Valves.
  - d. Cooper Cameron Valves; a division of Cooper Cameron Corporation.
  - e. Crane Co.; Crane Valve Group; Center Line.
  - f. Crane Co.; Crane Valve Group; Stockham Division.
  - g. DeZurik Water Controls.
  - h. Flo Fab Inc.
  - i. Hammond Valve.
  - j. Kitz Corporation.
  - k. Legend Valve.
  - l. Milwaukee Valve Company.
  - m. Mueller Steam Specialty; a division of SPX Corporation.
  - n. NIBCO INC.
  - o. Norriseal; a Dover Corporation company.

- p. Spence Strainers International; a division of CIRCOR International, Inc.
- q. Sure Flow Equipment Inc.
- r. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Nickel-plated or -coated ductile iron.

E. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Stainless-Steel Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. American Valve, Inc.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corporation.
- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Flo Fab Inc.
- i. Hammond Valve.
- j. Kitz Corporation.
- k. Legend Valve.
- l. Milwaukee Valve Company.
- m. Mueller Steam Specialty; a division of SPX Corporation.
- n. NIBCO INC.
- o. Norriseal; a Dover Corporation company.
- p. Red-White Valve Corporation.
- q. Spence Strainers International; a division of CIRCOR International, Inc.
- r. Sure Flow Equipment Inc.
- s. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

F. 200 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Stainless-Steel Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. ABZ Valves and Controls; A div. of ABZ Manufacturing, Inc.
  - b. American Valve, Inc.
  - c. Conbraco Industries, Inc.; Apollo Valves.
  - d. Cooper Cameron Valves; A div. of Cooper Cameron Corp.
  - e. Crane Co.; Crane Valve Group; Jenkins Valves.
  - f. Crane Co.; Crane Valve Group; Stockham Div.
  - g. DeZurik Water Controls.
  - h. Flo Fab Inc.
  - i. Hammond Valve.
  - j. Kitz Corporation.
  - k. Legend Valve.
  - l. Milwaukee Valve Company.
  - m. Mueller Steam Specialty; a division of SPX Corporation.
  - n. NIBCO INC.
  - o. Norriseal; a Dover Corporation company.
  - p. Red-White Valve Corporation.
  - q. Spence Strainers International; a division of CIRCOR International, Inc.
  - r. Sure Flow Equipment Inc.
  - s. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

2.7 IRON, GROOVED-END BUTTERFLY VALVES

A. 175 CWP, Iron, Grooved-End Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Kennedy Valve; a division of McWane, Inc.
  - b. Shurjoint Piping Products.
  - c. Tyco Fire Products LP; Grinnell Mechanical Products.
  - d. Victaulic Company.
  - e.
2. Description:
  - a. Standard: MSS SP-67, Type I.
  - b. CWP Rating: 175 psig.
  - c. Body Material: Coated, ductile iron.

- d. Stem: Two-piece stainless steel.
- e. Disc: Coated, ductile iron.
- f. Seal: EPDM.

B. 300 CWP, Iron, Grooved-End Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Anvil International, Inc.
  - b. Kennedy Valve; a division of McWane, Inc.
  - c. Mueller Steam Specialty; a division of SPX Corporation.
  - d. NIBCO INC.
  - e. Shurjoint Piping Products.
  - f. Tyco Fire Products LP; Grinnell Mechanical Products.
  - g. Victaulic Company.
2. Description:
  - a. Standard: MSS SP-67, Type I.
  - b. NPS 8 and Smaller CWP Rating: 300 psig.
  - c. NPS 10 and Larger CWP Rating: 200 psig.
  - d. Body Material: Coated, ductile iron.
  - e. Stem: Two-piece stainless steel.
  - f. Disc: Coated, ductile iron.
  - g. Seal: EPDM.

2.8 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Crane Co.; Crane Valve Group; Crane Valves.
  - b. Crane Co.; Crane Valve Group; Jenkins Valves.
  - c. Crane Co.; Crane Valve Group; Stockham Division.
2. Description:
  - a. Standard: MSS SP-80, Type 1.
  - b. CWP Rating: 200 psig.
  - c. Body Design: Vertical flow.
  - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
  - e. Ends: Threaded.
  - f. Disc: Bronze.

B. Class 125, Lift Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Flo Fab Inc.
- b. Hammond Valve.
- c. Kitz Corporation.
- d. Milwaukee Valve Company.
- e. Mueller Steam Specialty; a division of SPX Corporation.
- f. NIBCO INC.
- g. Red-White Valve Corporation.
- h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 200 psig.
- c. Body Design: Vertical flow.
- d. Body Material: ASTM B 61 or ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: NBR, PTFE, or TFE.

2.9 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. American Valve, Inc.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. Hammond Valve.
- f. Kitz Corporation.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Powell Valves.
- j. Red-White Valve Corporation.
- k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- l. Zy-Tech Global Industries, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.
- e. Kitz Corporation.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Red-White Valve Corporation.
- i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 4.
- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: PTFE or TFE.

C. Class 150, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. American Valve, Inc.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. Kitz Corporation.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Red-White Valve Corporation.
- i. Zy-Tech Global Industries, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 300 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

D. Class 150, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Hammond Valve.
- d. Milwaukee Valve Company.
- e. NIBCO INC.

- f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
- a. Standard: MSS SP-80, Type 4.
  - b. CWP Rating: 300 psig.
  - c. Body Design: Horizontal flow.
  - d. Body Material: ASTM B 62, bronze.
  - e. Ends: Threaded.
  - f. Disc: PTFE or TFE.

## 2.10 IRON SWING CHECK VALVES

### A. Class 125, Iron Swing Check Valves with Metal Seats:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Crane Co.; Crane Valve Group; Crane Valves.
  - b. Crane Co.; Crane Valve Group; Jenkins Valves.
  - c. Crane Co.; Crane Valve Group; Stockham Division.
  - d. Hammond Valve.
  - e. Kitz Corporation.
  - f. Legend Valve.
  - g. Milwaukee Valve Company.
  - h. NIBCO INC.
  - i. Powell Valves.
  - j. Red-White Valve Corporation.
  - k. Sure Flow Equipment Inc.
  - l. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - m. Zy-Tech Global Industries, Inc.
2. Description:
- a. Standard: MSS SP-71, Type I.
  - b. CWP Rating: 200 psig.
  - c. Body Design: Clear or full waterway.
  - d. Body Material: ASTM A 126, gray iron with bolted bonnet.
  - e. Ends: Flanged.
  - f. Trim: Bronze.
  - g. Gasket: Asbestos free.

### B. Class 125, Iron Swing Check Valves with Nonmetallic-to-Metal Seats:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Crane Co.; Crane Valve Group; Crane Valves.
  - b. Crane Co.; Crane Valve Group; Stockham Division.
  - c. Hammond Valve.
2. Description:

- a. Standard: MSS SP-71, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Clear or full waterway.
- d. Body Material: ASTM A 126, gray iron with bolted bonnet.
- e. Ends: Flanged.
- f. Trim: Composition.
- g. Seat Ring: Bronze.
- h. Disc Holder: Bronze.
- i. Disc: PTFE or TFE.
- j. Gasket: Asbestos free.

C. Class 250, Iron Swing Check Valves with Metal Seats:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

- 2. Description:

- a. Standard: MSS SP-71, Type I.
- b. CWP Rating: 500 psig.
- c. Body Design: Clear or full waterway.
- d. Body Material: ASTM A 126, gray iron with bolted bonnet.
- e. Ends: Flanged.
- f. Trim: Bronze.
- g. Gasket: Asbestos free.

2.11 IRON SWING CHECK VALVES WITH CLOSURE CONTROL

A. Class 125, Iron Swing Check Valves with Lever- and Spring-Closure Control:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. NIBCO INC.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.

- 2. Description:

- a. Standard: MSS SP-71, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Clear or full waterway.
- d. Body Material: ASTM A 126, gray iron with bolted bonnet.
- e. Ends: Flanged.

- f. Trim: Bronze.
- g. Gasket: Asbestos free.
- h. Closure Control: Factory-installed, exterior lever and spring.

B. Class 125, Iron Swing Check Valves with Lever- and Weight-Closure Control:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-71, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Clear or full waterway.
- d. Body Material: ASTM A 126, gray iron with bolted bonnet.
- e. Ends: Flanged.
- f. Trim: Bronze.
- g. Gasket: Asbestos free.
- h. Closure Control: Factory-installed, exterior lever and weight.

## 2.12 IRON, GROOVED-END SWING CHECK VALVES

A. 300 CWP, Iron, Grooved-End Swing Check Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Anvil International, Inc.
- b. Shurjoint Piping Products.
- c. Tyco Fire Products LP; Grinnell Mechanical Products.
- d. Victaulic Company.

2. Description:

- a. CWP Rating: 300 psig.
- b. Body Material: ASTM A 536, ductile iron.
- c. Seal: EPDM.
- d. Disc: Spring-operated, ductile iron or stainless steel.

## 2.13 IRON, CENTER-GUIDED CHECK VALVES

A. Class 125, Iron, Compact-Wafer, Center-Guided Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Anvil International, Inc.
- b. APCO Willamette Valve and Primer Corporation.
- c. Crispin Valve.
- d. DFT Inc.
- e. Flo Fab Inc.
- f. GA Industries, Inc.
- g. Hammond Valve.
- h. Metraflex, Inc.
- i. Milwaukee Valve Company.
- j. Mueller Steam Specialty; a division of SPX Corporation.
- k. NIBCO INC.
- l. Spence Strainers International; a division of CIRCOR International, Inc.
- m. Sure Flow Equipment Inc.
- n. Val-Matic Valve & Manufacturing Corp.
- o. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Compact wafer.
- e. Seat: Bronze.

B. Class 125, Iron, Globe, Center-Guided Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. DFT Inc.
- d. Flomatic Corporation.
- e. Hammond Valve.
- f. Metraflex, Inc.
- g. Milwaukee Valve Company.
- h. Mueller Steam Specialty; a division of SPX Corporation.
- i. NIBCO INC.
- j. Spence Strainers International; a division of CIRCOR International, Inc.
- k. Sure Flow Equipment Inc.
- l. Val-Matic Valve & Manufacturing Corp.
- m. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Globe, spring loaded.
- e. Ends: Flanged.
- f. Seat: Bronze.

C. Class 150, Iron, Compact-Wafer, Center-Guided Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. APCO Willamette Valve and Primer Corporation.
  - b. Crispin Valve.
  - c. Val-Matic Valve & Manufacturing Corp.
2. Description:
  - a. Standard: MSS SP-125.
  - b. CWP Rating: 300 psig.
  - c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
  - d. Style: Compact wafer.
  - e. Seat: Bronze.

D. Class 150, Iron, Globe, Center-Guided Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. APCO Willamette Valve and Primer Corporation.
  - b. Crispin Valve.
  - c. Val-Matic Valve & Manufacturing Corp.
2. Description:
  - a. Standard: MSS SP-125.
  - b. CWP Rating: 300 psig.
  - c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
  - d. Style: Globe, spring loaded.
  - e. Ends: Flanged.
  - f. Seat: Bronze.

E. Class 250, Iron, Compact-Wafer, Center-Guided Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. APCO Willamette Valve and Primer Corporation.
  - b. Crispin Valve.
  - c. DFT Inc.
  - d. Flo Fab Inc.
  - e. Hammond Valve.
  - f. Metraflex, Inc.
  - g. Milwaukee Valve Company.
  - h. NIBCO INC.
  - i. Sure Flow Equipment Inc.
  - j. Val-Matic Valve & Manufacturing Corp.
2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 400 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Compact wafer, spring loaded.
- e. Seat: Bronze.

F. Class 250, Iron, Globe, Center-Guided Check Valves with Metal Seat:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. DFT Inc.
- d. Flomatic Corporation.
- e. Hammond Valve.
- f. Metraflex, Inc.
- g. Milwaukee Valve Company.
- h. Mueller Steam Specialty; a division of SPX Corporation.
- i. NIBCO INC.
- j. Val-Matic Valve & Manufacturing Corp.

- 2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 400 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Globe, spring loaded.
- e. Ends: Flanged.
- f. Seat: Bronze.

G. Class 300, Iron, Compact-Wafer, Center-Guided Check Valves with Metal Seat:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. Val-Matic Valve & Manufacturing Corp.
- d.

- 2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 500 psig.
- c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
- d. Style: Compact wafer, spring loaded.
- e. Seat: Bronze.

H. Class 300, Iron, Globe, Center-Guided Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 500 psig.
- c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
- d. Style: Globe, spring loaded.
- e. Ends: Flanged.
- f. Seat: Bronze.

I. Class 125, Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. DFT Inc.
- d. Flo Fab Inc.
- e. Hammond Valve.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Spence Strainers International; a division of CIRCOR International, Inc.
- i. Sure Flow Equipment Inc.
- j. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Compact wafer.
- e. Seat: EPDM or NBR.

J. Class 125, Iron, Globe, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Anvil International, Inc.
- b. APCO Willamette Valve and Primer Corporation.
- c. Crispin Valve.
- d. DFT Inc.
- e. GA Industries, Inc.
- f. Hammond Valve.
- g. Milwaukee Valve Company.

- h. NIBCO INC.
- i. Sure Flow Equipment Inc.
- j. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Globe, spring loaded.
- e. Ends: Flanged.
- f. Seat: EPDM or NBR.

K. Class 150, Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 300 psig.
- c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
- d. Style: Compact wafer.
- e. Seat: EPDM or NBR.

L. Class 150, Iron, Globe, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. DFT Inc.
- d. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 300 psig.
- c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
- d. Style: Globe, spring loaded.
- e. Ends: Flanged.
- f. Seat: EPDM or NBR.

M. Class 250, Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. DFT Inc.
- d. Flo Fab Inc.
- e. Hammond Valve.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Sure Flow Equipment Inc.
- i. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 400 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Compact wafer, spring loaded.
- e. Seat: EPDM or NBR.

N. Class 250, Iron, Globe, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. DFT Inc.
- d. Hammond Valve.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 400 psig.
- c. Body Material: ASTM A 126, gray iron.
- d. Style: Globe, spring loaded.
- e. Ends: Flanged.
- f. Seat: EPDM or NBR .

O. Class 300, Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crispin Valve.
- c. Val-Matic Valve & Manufacturing Corp.

2. Description:
  - a. Standard: MSS SP-125.
  - b. CWP Rating: 500 psig.
  - c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
  - d. Style: Compact wafer, spring loaded.
  - e. Seat: EPDM or NBR .

P. Class 300, Iron, Globe, Center-Guided Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. APCO Willamette Valve and Primer Corporation.
  - b. Crispin Valve.
  - c. Val-Matic Valve & Manufacturing Corp.
  - d.
2. Description:
  - a. Standard: MSS SP-125.
  - b. CWP Rating: 500 psig.
  - c. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
  - d. Style: Globe, spring loaded.
  - e. Ends: Flanged.
  - f. Seat: EPDM or NBR .

2.14 IRON, PLATE-TYPE CHECK VALVES

A. Class 125, Iron, Dual-Plate Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. APCO Willamette Valve and Primer Corporation.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Flomatic Corporation.
  - d. Mueller Steam Specialty; a division of SPX Corporation.
2. Description:
  - a. Standard: API 594.
  - b. CWP Rating: 200 psig.
  - c. Body Design: Wafer, spring-loaded plates.
  - d. Body Material: ASTM A 126, gray iron.
  - e. Seat: Bronze.

B. Class 150, Iron, Dual-Plate Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Mueller Steam Specialty; a division of SPX Corporation.
- d. Val-Matic Valve & Manufacturing Corp.
- e.

2. Description:

- a. Standard: API 594.
- b. CWP Rating: 300 psig.
- c. Body Design: Wafer, spring-loaded plates.
- d. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
- e. Seat: Bronze.

C. Class 250, Iron, Dual-Plate Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Mueller Steam Specialty; a division of SPX Corporation

2. Description:

- a. Standard: API 594.
- b. CWP Rating: 400 psig.
- c. Body Design: Wafer, spring-loaded plates.
- d. Body Material: ASTM A 126, gray iron.
- e. Seat: Bronze.

D. Class 300, Iron, Dual-Plate Check Valves with Metal Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Mueller Steam Specialty; a division of SPX Corporation.
- d. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: API 594.
- b. CWP Rating: 500 psig.
- c. Body Design: Wafer, spring-loaded plates.
- d. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
- e. Seat: Bronze.

E. Class 125, Iron, Single-Plate Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Flo Fab Inc.
- b. Sure Flow Equipment Inc.
- c.

2. Description:

- a. Standard: API 594.
- b. CWP Rating: 200 psig.
- c. Body Design: Wafer, spring-loaded plate.
- d. Body Material: ASTM A 126, gray iron.
- e. Seat: EPDM or NBR .

F. Class 125, Iron, Dual-Plate Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Cooper Cameron Valves TVB Techno.
- c. Crane Co.; Crane Valve Group; Crane Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. NIBCO INC.
- f. Spence Strainers International; a division of CIRCOR International, Inc.
- g. Sure Flow Equipment Inc.
- h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: API 594.
- b. CWP Rating: 200 psig.
- c. Body Design: Wafer, spring-loaded plates.
- d. Body Material: ASTM A 126, gray iron.
- e. Seat: EPDM or NBR .

G. Class 150, Iron, Dual-Plate Check Valves with Resilient Seat:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. APCO Willamette Valve and Primer Corporation.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Val-Matic Valve & Manufacturing Corp.

2. Description:

- a. Standard: API 594.
- b. CWP Rating: 300 psig.
- c. Body Design: Wafer, spring-loaded plates.

- d. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.
- e. Seat: EPDM or NBR .

H. Class 250, Iron, Wafer, Single-Plate Check Valves with Resilient Seat:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Sure Flow Equipment Inc.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Crane Co.; Crane Valve Group; Jenkins Valves.
- 2. Description:
  - a. Standard: API 594.
  - b. CWP Rating: 400 psig.
  - c. Body Design: Wafer, spring-loaded plate.
  - d. Body Material: ASTM A 126, gray iron.
  - e. Seat: EPDM or NBR .

I. Class 250, Iron, Dual-Plate Check Valves with Resilient Seat:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. APCO Willamette Valve and Primer Corporation.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Sure Flow Equipment Inc.
- 2. Description:
  - a. Standard: API 594.
  - b. CWP Rating: 400 psig.
  - c. Body Design: Wafer, spring-loaded plates.
  - d. Body Material: ASTM A 126, gray iron.
  - e. Seat: EPDM or NBR .

J. Class 300, Iron, Dual-Plate Check Valves with Resilient Seat:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. APCO Willamette Valve and Primer Corporation.
  - b. Val-Matic Valve & Manufacturing Corp.
  - c. Crane Co.; Crane Valve Group; Crane Valves.
- 2. Description:
  - a. Standard: API 594.
  - b. CWP Rating: 500 psig.
  - c. Body Design: Wafer, spring-loaded plates.
  - d. Body Material: ASTM A 395/A 395M or ASTM A 536, ductile iron.

- e. Seat: EPDM or NBR .

## 2.15 BRONZE GATE VALVES

### A. Class 125, NRS Bronze Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. American Valve, Inc.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Crane Co.; Crane Valve Group; Jenkins Valves.
  - d. Crane Co.; Crane Valve Group; Stockham Division.
  - e. Hammond Valve.
  - f. Kitz Corporation.
  - g. Milwaukee Valve Company.
  - h. NIBCO INC.
  - i. Powell Valves.
  - j. Red-White Valve Corporation.
  - k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - l. Zy-Tech Global Industries, Inc.

### 2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded or solder joint.
- e. Stem: Bronze.
- f. Disc: Solid wedge; bronze.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

### B. Class 125, RS Bronze Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. American Valve, Inc.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Crane Co.; Crane Valve Group; Jenkins Valves.
  - d. Crane Co.; Crane Valve Group; Stockham Division.
  - e. Hammond Valve.
  - f. Kitz Corporation.
  - g. Milwaukee Valve Company.
  - h. NIBCO INC.
  - i. Powell Valves.
  - j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - k. Zy-Tech Global Industries, Inc.

### 2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded or solder joint.
- e. Stem: Bronze.
- f. Disc: Solid wedge; bronze.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

C. Class 150, NRS Bronze Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Hammond Valve.
- b. Kitz Corporation.
- c. Milwaukee Valve Company.
- d. NIBCO INC.
- e. Powell Valves.
- f. Red-White Valve Corporation.
- g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

- 2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 300 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
- d. Ends: Threaded.
- e. Stem: Bronze.
- f. Disc: Solid wedge; bronze.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

D. Class 150, RS Bronze Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. Hammond Valve.
- d. Kitz Corporation.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Powell Valves.
- h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- i. Zy-Tech Global Industries, Inc.

- 2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 300 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.

- d. Ends: Threaded.
- e. Stem: Bronze.
- f. Disc: Solid wedge; bronze.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

2.16 IRON GATE VALVES

A. Class 125, NRS, Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Flo Fab Inc.
- e. Hammond Valve.
- f. Kitz Corporation.
- g. Legend Valve.
- h. Milwaukee Valve Company.
- i. NIBCO INC.
- j. Powell Valves.
- k. Red-White Valve Corporation.
- l. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- m. Zy-Tech Global Industries, Inc.

2. Description:

- a. Standard: MSS SP-70, Type I.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 126, gray iron with bolted bonnet.
- d. Ends: Flanged.
- e. Trim: Bronze.
- f. Disc: Solid wedge.
- g. Packing and Gasket: Asbestos free.

B. Class 125, OS&Y, Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Flo Fab Inc.
- e. Hammond Valve.
- f. Kitz Corporation.
- g. Legend Valve.
- h. Milwaukee Valve Company.
- i. NIBCO INC.
- j. Powell Valves.

- k. Red-White Valve Corporation.
- l. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- m. Zy-Tech Global Industries, Inc.

2. Description:

- a. Standard: MSS SP-70, Type I.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 126, gray iron with bolted bonnet.
- d. Ends: Flanged.
- e. Trim: Bronze.
- f. Disc: Solid wedge.
- g. Packing and Gasket: Asbestos free.

C. Class 250, NRS, Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. NIBCO INC.

2. Description:

- a. Standard: MSS SP-70, Type I.
- b. CWP Rating: 500 psig.
- c. Body Material: ASTM A 126, gray iron with bolted bonnet.
- d. Ends: Flanged.
- e. Trim: Bronze.
- f. Disc: Solid wedge.
- g. Packing and Gasket: Asbestos free.

D. Class 250, OS&Y, Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. Hammond Valve.
- d. Milwaukee Valve Company.
- e. NIBCO INC.
- f. Powell Valves.
- g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- h.

2. Description:

- a. Standard: MSS SP-70, Type I.
- b. CWP Rating: 500 psig.
- c. Body Material: ASTM A 126, gray iron with bolted bonnet.
- d. Ends: Flanged.

- e. Trim: Bronze.
- f. Disc: Solid wedge.
- g. Packing and Gasket: Asbestos free.

## 2.17 GATE VALVE ACCESSORIES AND SPECIALTIES

### A. Tapping-Sleeve Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
  - b. East Jordan Iron Works, Inc.
  - c. Flowserve.
  - d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
  - e. McWane, Inc.; Kennedy Valve Div.
  - f. McWane, Inc.; M & H Valve Company Div.
  - g. Mueller Co.; Water Products Div.
  - h. U.S. Pipe and Foundry Company.
4. Description: Sleeve and valve compatible with drilling machine.
  - a. Standard: MSS SP-60.
  - b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
  - c. Valve: AWWA, cast-iron, nonrising-stem, metal resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

### B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

### C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

## 2.18 BRONZE GLOBE VALVES

### A. Class 125, Bronze Globe Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. Hammond Valve.
- d. Kitz Corporation.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Powell Valves.
- h. Red-White Valve Corporation.
- i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- j. Zy-Tech Global Industries, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded or solder joint.
- e. Stem and Disc: Bronze.
- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron, bronze, or aluminum.

B. Class 125, Bronze Globe Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. NIBCO INC.
- d. Red-White Valve Corporation.

2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded or solder joint.
- e. Stem: Bronze.
- f. Disc: PTFE or TFE.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

C. Class 150, Bronze Globe Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Hammond Valve.
- c. Kitz Corporation.
- d. Milwaukee Valve Company.
- e. NIBCO INC.
- f. Powell Valves.

- g. Red-White Valve Corporation.
- h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- i. Zy-Tech Global Industries, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 300 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
- d. Ends: Threaded.
- e. Stem: Bronze.
- f. Disc: PTFE or TFE.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

2.19 IRON GLOBE VALVES

A. Class 125, Iron Globe Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.
- e. Kitz Corporation.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Powell Valves.
- i. Red-White Valve Corporation.
- j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- k. Zy-Tech Global Industries, Inc.

2. Description:

- a. Standard: MSS SP-85, Type I.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 126, gray iron with bolted bonnet.
- d. Ends: Flanged.
- e. Trim: Bronze.
- f. Packing and Gasket: Asbestos free.

B. Class 250, Iron Globe Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.

- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-85, Type I.
- b. CWP Rating: 500 psig.
- c. Body Material: ASTM A 126, gray iron with bolted bonnet.
- d. Ends: Flanged.
- e. Trim: Bronze.
- f. Packing and Gasket: Asbestos free.

2.20 LUBRICATED PLUG VALVES

A. Class 125, Regular-Gland, Lubricated Plug Valves with Threaded Ends:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Nordstrom Valves, Inc.
- b.

2. Description:

- a. Standard: MSS SP-78, Type II.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
- d. Pattern: Regular or short Venturi .
- e. Plug: Cast iron or bronze with sealant groove.

B. Class 125, Regular-Gland, Lubricated Plug Valves with Flanged Ends:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Nordstrom Valves, Inc.
- b.

2. Description:

- a. Standard: MSS SP-78, Type II.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
- d. Pattern: Regular or short Venturi .
- e. Plug: Cast iron or bronze with sealant groove.

C. Class 125, Cylindrical, Lubricated Plug Valves with Threaded Ends:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Homestead Valve; a division of Olson Technologies, Inc.
- b. Milliken Valve Company.
- c. R & M Energy Systems; a unit of Robbins & Myers, Inc.

2. Description:

- a. Standard: MSS SP-78, Type IV.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
- d. Pattern: Regular or short Venturi .
- e. Plug: Cast iron or bronze with sealant groove.

D. Class 125, Cylindrical, Lubricated Plug Valves with Flanged Ends:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Homestead Valve; a division of Olson Technologies, Inc.
- b. Milliken Valve Company.
- c. R & M Energy Systems; a unit of Robbins & Myers, Inc.

2. Description:

- a. Standard: MSS SP-78, Type IV.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
- d. Pattern: Regular or short Venturi .
- e. Plug: Cast iron or bronze with sealant groove.

E. Class 250, Regular-Gland, Lubricated Plug Valves with Threaded Ends:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Nordstrom Valves, Inc.
- b.

2. Description:

- a. Standard: MSS SP-78, Type II.
- b. CWP Rating: 400 psig.
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
- d. Pattern: Regular or short Venturi .
- e. Plug: Cast iron or bronze with sealant groove.

F. Class 250, Regular-Gland, Lubricated Plug Valves with Flanged Ends:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Nordstrom Valves, Inc.
    - b. Homestead Valve; a division of Olson Technologies, Inc.
    - c. Milliken Valve Company.
  2. Description:
    - a. Standard: MSS SP-78, Type II.
    - b. CWP Rating: 400 psig.
    - c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
    - d. Pattern: Regular or short Venturi .
    - e. Plug: Cast iron or bronze with sealant groove.
- G. Class 250, Cylindrical, Lubricated Plug Valves with Threaded Ends:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Homestead Valve; a division of Olson Technologies, Inc.
    - b. Milliken Valve Company.
    - c. R & M Energy Systems; a unit of Robbins & Myers, Inc.
  2. Description:
    - a. Standard: MSS SP-78, Type IV.
    - b. CWP Rating: 400 psig.
    - c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
    - d. Pattern: Regular or short Venturi .
    - e. Plug: Cast iron or bronze with sealant groove.
- H. Class 250, Cylindrical, Lubricated Plug Valves with Flanged Ends:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Homestead Valve; a division of Olson Technologies, Inc.
    - b. Milliken Valve Company.
    - c. R & M Energy Systems; a unit of Robbins & Myers, Inc.
  2. Description:
    - a. Standard: MSS SP-78, Type IV.
    - b. CWP Rating: 400 psig.
    - c. Body Material: ASTM A 48/A 48M or ASTM A 126, Grade 40 cast iron with lubrication-sealing system.
    - d. Pattern: Regular or short Venturi .
    - e. Plug: Cast iron or bronze with sealant groove.

## 2.21 CHAINWHEELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Babbitt Steam Specialty Co.
  - 2. Roto Hammer Industries.
  - 3. Trumbull Industries.
- B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
  - 1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
  - 2. Attachment: For connection to ball butterfly and plug valve stems.
  - 3. Sprocket Rim with Chain Guides: Ductile iron Ductile or cast iron Cast iron Aluminum Bronze, of type and size required for valve. Include zinc coating.
  - 4. Chain: Hot-dip, galvanized steel Brass Stainless steel, of size required to fit sprocket rim.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

### 3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install chainwheels on operators for ball butterfly gate globe and plug valves NPS 4 and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor.
- F. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.
2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
3. Lift Check Valves: With stem upright and plumb.

### 3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

### 3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
  1. Shutoff Service: Ball, butterfly, or gate, gate, or plug valves.
  2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
  3. Throttling Service: Globe Globe or angle or ball or butterfly, ball, or butterfly valves.
  4. Pump-Discharge Check Valves:
    - a. NPS 2 and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
    - b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, metal or resilient-seat check valves.
    - c. NPS 2-1/2 and Larger for Sanitary Waste and Storm Drainage: Iron swing check valves with lever and weight or spring.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
  2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
  3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
  4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
  5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
  6. For Steel Piping, NPS 5 and Larger: Flanged ends.
  7. For Grooved-End Copper Tubing and Steel Piping: Valve ends may be grooved.

### 3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
  1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
  2. Bronze Angle Valves: Class 125 Class 150, bronze nonmetallic disc.
  3. Ball Valves: One Two Three piece, full regular reduced port, brass or bronze with brass bronze stainless-steel trim.
  4. Bronze Swing Check Valves: Class 125 Class 150, bronze nonmetallic disc.
  5. Bronze Gate Valves: Class 125 Class 150, NRS RS.

6. Bronze Globe Valves: Class 125 Class 150, bronze nonmetallic disc.

B. Pipe NPS 2-1/2 and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.
2. Iron Ball Valves: Class 150.
3. Iron, Single-Flange Butterfly Valves: 200 CWP, EPDM NBR seat, aluminum-bronze ductile-iron stainless-steel disc.
4. Iron, Grooved-End Butterfly Valves: 175 300 CWP.
5. Iron Swing Check Valves: Class 125 Class 250, metal nonmetallic-to-metal seats.
6. Iron Swing Check Valves with Closure Control: Class 125, lever and spring weight.
7. Iron, Grooved-End Swing Check Valves: 300 CWP.
8. Iron, Center-Guided Check Valves: Class 125 Class 150 Class 250 Class 300, compact-wafer globe, metal resilient seat.
9. Iron, Plate-Type Check Valves: Class 125 Class 150 Class 250 Class 300; single dual plate; metal resilient seat.
10. Iron Gate Valves: Class 125 Class 250, NRS OS&Y.
11. Iron Globe Valves: Class 125 Class 250.

### 3.6 SANITARY-WASTE AND STORM-DRAINAGE VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze Angle Valves: Class 125 Class 150, bronze nonmetallic stainless-steel disc.
3. Ball Valves: One Two Three piece, full regular reduced port, brass or bronze with brass bronze stainless-steel trim.
4. Bronze Swing Check Valves: Class 125 Class 150, bronze nonmetallic disc.
5. Bronze Gate Valves: Class 125 Class 150, NRS RS.
6. Bronze Globe Valves: Class 125 Class 150, bronze nonmetallic disc.

B. Pipe NPS 2-1/2 and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.
2. Iron Ball Valves: Class 150.
3. Iron Swing Check Valves: Class 125 Class 250, metal nonmetallic-to-metal seats.
4. Iron Swing Check Valves with Closure Control: Class 125, lever and spring weight.
5. Iron, Grooved-End Swing Check Valves: 300 CWP.
6. Iron Gate Valves: Class 125 Class 250, NRS OS&Y.
7. Iron Globe Valves: Class 125 Class 250.
8. Lubricated Plug Valves: Class 125 Class 250, regular gland cylindrical, threaded flanged.

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## SECTION 220529

### HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following hangers and supports for plumbing system piping and equipment:

1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Fiberglass pipe hangers.
4. Metal framing systems.
5. Fiberglass strut systems.
6. Thermal-hanger shield inserts.
7. Fastener systems.
8. Pipe stands.
9. Pipe positioning systems.
10. Equipment supports.

- B. Related Sections include the following:

1. 211313
2. 220548

##### 1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

## 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Steel pipe hangers and supports.
  - 2. Fiberglass pipe hangers.
  - 3. Thermal-hanger shield inserts.
  - 4. Powder-actuated fastener systems.
  - 5. Pipe positioning systems.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer registered and in good standing in the state of New York. Show fabrication and installation details and include calculations for the following:
  - 1. Trapeze pipe hangers. Include Product Data for components.
  - 2. Metal framing systems. Include Product Data for components.
  - 3. Fiberglass strut systems. Include Product Data for components.
  - 4. Pipe stands. Include Product Data for components.
  - 5. Equipment supports.
- C. Welding certificates.

## 1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel." AWS D1.4, "Structural Welding Code--Reinforcing Steel." ASME Boiler and Pressure Vessel Code: Section IX.
- B. Welding: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code--Steel."
  - 2. AWS D1.2, "Structural Welding Code--Aluminum."
  - 3. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
  - 4. ASME Boiler and Pressure Vessel Code: Section IX.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:

1. AAA Technology & Specialties Co., Inc.
2. Bergen-Power Pipe Supports.
3. B-Line Systems, Inc.; a division of Cooper Industries.
4. Carpenter & Paterson, Inc.
5. Empire Industries, Inc.
6. ERICO/Michigan Hanger Co.
7. Globe Pipe Hanger Products, Inc.
8. Grinnell Corp.
9. GS Metals Corp.
10. National Pipe Hanger Corporation.
11. PHD Manufacturing, Inc.
12. PHS Industries, Inc.
13. Piping Technology & Products, Inc.
14. Tolco Inc.

C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

### 2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

### 2.4 FIBERGLASS PIPE HANGERS

A. Clevis-Type, Fiberglass Pipe Hangers: Similar to MSS Type 1, steel pipe hanger except hanger is made of fiberglass and continuous-thread rod and nuts are made of polyurethane polyurethane or stainless steel stainless steel .

#### 1. Manufacturers:

- a. B-Line Systems, Inc.; a division of Cooper Industries.
- b. Champion Fiberglass, Inc.
- c. Cope, T. J., Inc.; Tyco International, Ltd.
- d. Seasafe, Inc.
- e. Unistrut Corp.; Tyco International, Ltd.
- f. Wesanco, Inc.

B. Strap-Type, Fiberglass Pipe Hangers: Made of fiberglass loop with stainless-steel continuous-thread rod, nuts, and support hook.

#### 1. Manufacturers:

- a. Plasti-Fab, Inc.
- b.

### 2.5 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.

C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.6 FIBERGLASS STRUT SYSTEMS

A. Description: Shop- or field-fabricated pipe-support assembly, similar to MFMA-3, made of fiberglass channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. Champion Fiberglass, Inc.
3. Cope, T. J., Inc.; Tyco International Ltd.
4. Seasafe, Inc.

2.7 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.

B. Manufacturers:

1. Carpenter & Paterson, Inc.
2. ERICO/Michigan Hanger Co.
3. PHS Industries, Inc.
4. Pipe Shields, Inc.
5. Rilco Manufacturing Company, Inc.
6. Value Engineered Products, Inc.

C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass ASTM C 552, Type II cellular glass with vapor barrier.

D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass ASTM C 552, Type II cellular glass.

E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

- G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

## 2.8 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

- 1. Manufacturers:

- a. Hilti, Inc.
- b. ITW Ramset/Red Head.
- c. Masterset Fastening Systems, Inc.
- d. MKT Fastening, LLC.
- e. Powers Fasteners.

- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

- 1. Manufacturers:

- a. B-Line Systems, Inc.; a division of Cooper Industries.
- b. Empire Industries, Inc.
- c. Hilti, Inc.
- d. ITW Ramset/Red Head.
- e. MKT Fastening, LLC.
- f. Powers Fasteners.

## 2.9 PIPE STAND FABRICATION

- A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

- B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.

- 1. Manufacturers:

- a. ERICO/Michigan Hanger Co.
- b. MIRO Industries.

- C. Low-Type, Single-Pipe Stand: One-piece plastic stainless-steel base unit with plastic roller, for roof installation without membrane penetration.

- 1. Manufacturers:

- a. MIRO Industries.
- b. Portable Pipe Hangers.

- D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.

1. Manufacturers:
    - a. ERICO/Michigan Hanger Co.
    - b. MIRO Industries.
    - c. Portable Pipe Hangers.
  2. Base: Plastic Stainless steel.
  3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
  4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
- E. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
1. Manufacturers:
    - a. Portable Pipe Hangers.
    - b. MIRO Industries.
    - c. ERICO/Michigan Hanger Co.
  2. Bases: One or more plastic.
  3. Vertical Members: Two or more protective-coated-steel channels.
  4. Horizontal Member: Protective-coated-steel channel.
  5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
- F. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural-steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

## 2.10 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.
- B. Manufacturers:
  1. C & S Mfg. Corp.
  2. HOLDRITE Corp.; Hubbard Enterprises.
  3. Samco Stamping, Inc.

## 2.11 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

## 2.12 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  1. Properties: Nonstaining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi, 28-day compressive strength.

## PART 3 - EXECUTION

### 3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
  - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
  - 5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
  - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
  - 10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
  - 11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
  - 12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
  - 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
  - 14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
  - 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
  - 16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
  - 17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.

18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
  19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
  20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
  21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

- a. Light (MSS Type 31): 750 lb.
  - b. Medium (MSS Type 32): 1500 lb.
  - c. Heavy (MSS Type 33): 3000 lb.
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
  2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
  3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
  4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
  5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
  6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
  7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
  8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
    - a. Horizontal (MSS Type 54): Mounted horizontally.
    - b. Vertical (MSS Type 55): Mounted vertically.
    - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

- O. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

### 3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Fiberglass Pipe Hanger Installation: Comply with applicable portions of MSS SP-69 and MSS SP-89. Install hangers and attachments as required to properly support piping from building structure.
- D. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- E. Fiberglass Strut System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled fiberglass struts.
- F. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- G. Fastener System Installation:
  - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- H. Pipe Stand Installation:
  - 1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
  - 2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 07 Section "Roof Accessories" for curbs.
- I. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Section "Plumbing Fixtures" for plumbing fixtures.
- J. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

- K. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- L. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- M. Install lateral bracing with pipe hangers and supports to prevent swaying.
- N. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- O. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- P. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- Q. Insulated Piping: Comply with the following:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 4. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    - b. NPS 4: 12 inches long and 0.06 inch thick.
    - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
  - 5. Pipes NPS 8 and Larger: Include wood inserts.
  - 6. Insert Material: Length at least as long as protective shield.
  - 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

### 3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches .

### 3.6 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections. Section "High-Performance Coatings."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 220529

## SECTION 220548

### VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:
  1. Isolation pads.
  2. Isolation mounts.
  3. Restrained elastomeric isolation mounts.
  4. Freestanding and restrained spring isolators.
  5. Housed spring mounts.
  6. Elastomeric hangers.
  7. Spring hangers.
  8. Spring hangers with vertical-limit stops.
  9. Pipe riser resilient supports.
  10. Resilient pipe guides.
  11. Seismic snubbers.
  12. Restraining braces and cables.
  13. Steel and inertia, vibration isolation equipment bases.

##### 1.3 DEFINITIONS

- A. IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:
  1. Site Class as Defined in the IBC: A B C D E F.
  2. Assigned Seismic Use Group or Building Category as Defined in the IBC: I II III.
    - a. Component Importance Factor: 1.0 1.5.
    - b. Component Response Modification Factor: 1.5 2.5 3.5 5.0.
    - c. Component Amplification Factor: 1.0 2.5.
  3. Design Spectral Response Acceleration at Short Periods (0.2 Second):
  4. Design Spectral Response Acceleration at 1-Second Period:

## 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
  - 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
    - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction.
    - b. Annotate to indicate application of each product submitted and compliance with requirements.
  - 3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.
- B. Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration-isolators, seismic restraints, and for designing vibration isolation bases.
  - 2. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system has been examined for excessive stress and that none will exist.
  - 3. Vibration Isolation Base Details: Detail overall dimensions, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, base weights, equipment static loads, power transmission, component misalignment, and cantilever loads.
  - 4. Seismic-Restraint Details:
    - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    - c. Preapproval and Evaluation Documentation: By an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).
- C. Coordination Drawings: Show coordination of seismic bracing for plumbing piping and equipment with other systems and equipment in the vicinity, including other supports and seismic restraints.
- D. Welding certificates.
- E. Qualification Data: For professional engineer and testing agency.
- F. Field quality-control test reports.
- G. Operation and Maintenance Data: For air-mounting systems to include in operation and maintenance manuals.

## 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproved by ICC-ES, or preapproved by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

## PART 2 - PRODUCTS

### 2.1 VIBRATION ISOLATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - 1. Ace Mountings Co., Inc.
  - 2. Amber/Booth Company, Inc.
  - 3. California Dynamics Corporation.
  - 4. Isolation Technology, Inc.
  - 5. Kinetics Noise Control.
  - 6. Mason Industries.
  - 7. Vibration Eliminator Co., Inc.
  - 8. Vibration Isolation.
  - 9. Vibration Mountings & Controls, Inc.
  - 10.
- D. Pads : Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
  - 1. Resilient Material: Oil- and water-resistant neoprene rubber hermetically sealed compressed fiberglass.
- E. Mounts: Double-deflection type, with molded, oil-resistant rubber, hermetically sealed compressed fiberglass, or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with baseplate for bolting to structure. Color-code or otherwise identify to indicate capacity range.

1. Materials: Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
  2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.
- F. Restrained Mounts: All-directional mountings with seismic restraint.
1. Materials: Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
  2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.
- G. Spring Isolators: Freestanding, laterally stable, open-spring isolators.
1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig.
  6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.
- H. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.
1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
  2. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
  3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
- I. Housed Spring Mounts: Housed spring isolator with integral seismic snubbers.
1. Housing: Ductile-iron or steel housing to provide all-directional seismic restraint.
  2. Base: Factory drilled for bolting to structure.
  3. Snubbers: Vertically adjustable to allow a maximum of 1/4-inch travel up or down before contacting a resilient collar.
- J. Elastomeric Hangers: Single or double-deflection type, fitted with molded, oil-resistant elastomeric isolator elements bonded to steel housings with threaded connections for hanger rods. Color-code or otherwise identify to indicate capacity range.
- K. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
  7. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.
- L. Spring Hangers with Vertical-Limit Stop: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression and with a vertical-limit stop.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
  7. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
  8. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.
- M. Pipe Riser Resilient Support: All-directional, acoustical pipe anchor consisting of 2 steel tubes separated by a minimum of 1/2-inch- thick neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig and for equal resistance in all directions.
- N. Resilient Pipe Guides: Telescopic arrangement of 2 steel tubes or post and sleeve arrangement separated by a minimum of 1/2-inch- thick neoprene. Where clearances are not readily visible, a factory-set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction shall be fitted. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

## 2.2 VIBRATION ISOLATION EQUIPMENT BASES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
1. Amber/Booth Company, Inc.
  2. California Dynamics Corporation.
  3. Isolation Technology, Inc.
  4. Kinetics Noise Control.
  5. Mason Industries.
  6. Vibration Eliminator Co., Inc.
  7. Vibration Isolation.
  8. Vibration Mountings & Controls, Inc.
- D. Steel Base: Factory-fabricated, welded, structural-steel bases and rails.
1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
    - a. Include supports for suction and discharge elbows for pumps.

2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
  3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
- E. Inertia Base: Factory-fabricated, welded, structural-steel bases and rails ready for placement of cast-in-place concrete.
1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
    - a. Include supports for suction and discharge elbows for pumps.
  2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
  3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
  4. Fabrication: Fabricate steel templates to hold equipment anchor-bolt sleeves and anchors in place during placement of concrete. Obtain anchor-bolt templates from supported equipment manufacturer.

### 2.3 SEISMIC-RESTRAINT DEVICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
1. Amber/Booth Company, Inc.
  2. California Dynamics Corporation.
  3. Cooper B-Line, Inc.; a division of Cooper Industries.
  4. Hilti, Inc.
  5. Kinetics Noise Control.
  6. Loos & Co.; Cableware Division.
  7. Mason Industries.
  8. TOLCO Incorporated; a brand of NIBCO INC.
  9. Unistrut; Tyco International, Ltd.
- D. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction.
1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- E. Snubbers: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
  2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
  3. Maximum 1/4-inch air gap, and minimum 1/4-inch- thick resilient cushion.
- F. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

- G. Restraint Cables: ASTM A 603 galvanized ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- H. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections Reinforcing steel angle clamped to hanger rod.
- I. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.
- J. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.
- K. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- L. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
- M. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

## 2.4 FACTORY FINISHES

- A. Finish: Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
  - 1. Powder coating on springs and housings.
  - 2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
  - 3. Baked enamel or powder coat for metal components on isolators for interior use.
  - 4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

### 3.3 VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Equipment Restraints:
  - 1. Install seismic snubbers on plumbing equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
  - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inches.
  - 3. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction providing required submittals for component.
- B. Piping Restraints:
  - 1. Comply with requirements in MSS SP-127.
  - 2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
  - 3. Brace a change of direction longer than 12 feet.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction providing required submittals for component.
- E. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- F. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- G. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- H. Drilled-in Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.

4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

### 3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Division 22 Section "Domestic Water Piping" for piping flexible connections.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: The City of New York will engage Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
  2. Schedule test with The City of New York, through Commissioner, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
  3. Obtain Commissioner's approval before transmitting test loads to structure. Provide temporary load-spreading members.
  4. Test at least four of each type and size of installed anchors and fasteners selected by Commissioner.
  5. Test to 90 percent of rated proof load of device.
  6. Measure isolator restraint clearance.
  7. Measure isolator deflection.
  8. Verify snubber minimum clearances.
  9. Air-Mounting System Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  10. Air-Mounting System Operational Test: Test the compressed-air leveling system.
  11. Test and adjust air-mounting system controls and safeties.
  12. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

### 3.6 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

- C. Adjust active height of sprint isolators.
- D. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.7 PLUMBING VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE

- A. Supported or Suspended Equipment:
  - 1. Equipment Location: Refer to Dwgs.
  - 2. Pads:
    - a. Material: Neoprene Rubber Hermetically sealed compressed fiberglass.
  - 3.
  - 4. Component Importance Factor: 1.0 1.5.
  - 5. Component Response Modification Factor: 1.5 2.5 3.5 5.0.
  - 6. Component Amplification Factor: 1.0 2.5.

END OF SECTION 220548

## SECTION 220553

### IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Stencils.
  - 5. Valve tags.
  - 6. Warning tags.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

##### 1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

#### PART 2 - PRODUCTS

##### 2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch Stainless steel, 0.025-inch Aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch 1/8 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black Blue Red White Yellow.
3. Background Color: Black Blue Red White Yellow.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

## 2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black Blue Red White Yellow.
- C. Background Color: Black Blue Red White Yellow.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater

viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

## 2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches high.

## 2.4 STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
  - 1. Stencil Material: Aluminum Brass Fiberboard or metal.
  - 2. Stencil Paint: Exterior, gloss, alkyd enamel acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
  - 3. Identification Paint: Exterior, alkyd enamel acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

## 2.5 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
  - 1. Tag Material: Brass, 0.032-inch Stainless steel, 0.025-inch Aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  - 2. Fasteners: Brass wire-link or beaded chain; or S-hook wire-link chain beaded chain S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

## 2.6 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
  1. Size: 3 by 5-1/4 inches minimum Approximately 4 by 7 inches.
  2. Fasteners: Brass grommet and wire Reinforced grommet and wire or string.
  3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  4. Color: Yellow background with black lettering.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

### 3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

### 3.3 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting High-Performance Coatings."
- B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles, complying with ASME A13.1, on each piping system.
  1. Identification Paint: Use for contrasting background.
  2. Stencil Paint: Use for pipe marking.
- C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  1. Near each valve and control device.
  2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  4. At access doors, manholes, and similar access points that permit view of concealed piping.
  5. Near major equipment items and other points of origination and termination.
  6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
  7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

D. Pipe Label Color Schedule:

1. Low-Pressure, Compressed-Air Piping:
  - a. Background Color: Black Blue Red White Yellow.
  - b. Letter Color: Black Blue Red White Yellow.
2. Medium-Pressure, Compressed-Air Piping:
  - a. Background Color: Black Blue Red White Yellow.
  - b. Letter Color: Black Blue Red White Yellow.
3. Domestic Water Piping:
  - a. Background Color: Black Blue Red White Yellow.
  - b. Letter Color: Black Blue Red White Yellow.
4. Sanitary Waste and Storm Drainage Piping:
  - a. Background Color: Black Blue Red White Yellow.
  - b. Letter Color: Black Blue Red White Yellow.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
  1. Valve-Tag Size and Shape:
    - a. Cold Water: 1-1/2 inches 2 inches, round square.
    - b. Hot Water: 1-1/2 inches 2 inches, round square.
    - c. Low-Pressure Compressed Air: 1-1/2 inches 2 inches, round square.
    - d. High-Pressure Compressed Air: 1-1/2 inches 2 inches, round square.
  2. Valve-Tag Color:
    - a. Cold Water: Natural Green.
    - b. Hot Water: Natural Green.
    - c. Low-Pressure Compressed Air: Natural Green.
    - d. High-Pressure Compressed Air: Natural Green.
  3. Letter Color:
    - a. Cold Water: Black White.
    - b. Hot Water: Black White.
    - c. Low-Pressure Compressed Air: Black White.
    - d. High-Pressure Compressed Air: Black White.

3.5 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 220553

## SECTION 220700

### PLUMBING INSULATION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

- 1. Insulation Materials:

- a. Calcium silicate.
    - b. Cellular glass.
    - c. Flexible elastomeric.
    - d. Mineral fiber.
    - e. Phenolic.
    - f. Polyisocyanurate.
    - g. Polyolefin.
    - h. Polystyrene.

- 2. Insulating cements.

- 3. Adhesives.

- 4. Mastics.

- 5. Lagging adhesives.

- 6. Sealants.

- 7. Factory-applied jackets.

- 8. Field-applied fabric-reinforcing mesh.

- 9. Field-applied cloths.

- 10. Field-applied jackets.

- 11. Tapes.

- 12. Securements.

- 13. Corner angles.

- B. Related Sections include the following:

- 1. Division 23 Section "HVAC Insulation."

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

- B. LEED Submittal:

- 1. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.

C. Shop Drawings:

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties, equipment connections, and access panels.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.
8. Detail field application for each equipment type.

D. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:

1. Sample Sizes:

- a. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
- b. Sheet Form Insulation Materials: 12 inches square.
- c. Jacket Materials for Pipe: 12 inches long by NPS 2.
- d. Sheet Jacket Materials: 12 inches square.
- e. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

E. Qualification Data: For qualified Installer.

F. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

G. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the

location indicated or, if not indicated, as directed by Commissioner. Use materials indicated for the completed Work.

1. Piping Mockups:
  - a. One 10-foot section of NPS 2 straight pipe.
  - b. One each of a 90-degree threaded, welded, and flanged elbow.
  - c. One each of a threaded, welded, and flanged tee fitting.
  - d. One NPS 2 or smaller valve, and one NPS 2-1/2 or larger valve.
  - e. Four support hangers including hanger shield and insert.
  - f. One threaded strainer and one flanged strainer with removable portion of insulation.
  - g. One threaded reducer and one welded reducer.
  - h. One pressure temperature tap.
  - i. One mechanical coupling.
2. Equipment Mockups: One tank or vessel.
3. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
4. Notify Commissioner seven days in advance of dates and times when mockups will be constructed.
5. Obtain Commissioner's approval of mockups before starting insulation application.
6. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Commissioner specifically approves such deviations in writing.
7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
8. Demolish and remove mockups when directed.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

#### 1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

#### 1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## PART 2 - PRODUCTS

### 2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Calcium Silicate:
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Industrial Insulation Group (The); Thermo-12 Gold.
  - 2. Preformed Pipe Sections: Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
  - 3. Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
  - 4. Prefabricated Fitting Covers: Comply with ASTM C 450 and ASTM C 585 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.
- G. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cell-U-Foam Corporation; Ultra-CUF.
    - b. Pittsburgh Corning Corporation; Foamglas Super K.
  - 2. Block Insulation: ASTM C 552, Type I.
  - 3. Special-Shaped Insulation: ASTM C 552, Type III.
  - 4. Board Insulation: ASTM C 552, Type IV.
  - 5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
  - 6. Preformed Pipe Insulation with Factory-Applied ASJ ASJ-SSL: Comply with ASTM C 552, Type II, Class 2.
  - 7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- H. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA Inc.; Aerocel.

- b. Armacell LLC; AP Armaflex.
  - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
- I. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; Duct Wrap.
    - b. Johns Manville; Microlite.
    - c. Knauf Insulation; Duct Wrap.
    - d. Manson Insulation Inc.; Alley Wrap.
    - e. Owens Corning; All-Service Duct Wrap.
- J. High-Temperature, Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type V, without factory-applied jacket.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Johns Manville; HTB 23 Spin-Glas.
    - b. Owens Corning; High Temperature Flexible Batt Insulations.
- K. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For equipment applications, provide insulation without factory-applied jacket with factory-applied ASJ with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; Commercial Board.
    - b. Fibrex Insulations Inc.; FBX.
    - c. Johns Manville; 800 Series Spin-Glas.
    - d. Knauf Insulation; Insulation Board.
    - e. Manson Insulation Inc.; AK Board.
    - f. Owens Corning; Fiberglas 700 Series.
- L. High-Temperature, Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type III, without factory-applied jacket.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Fibrex Insulations Inc.; FBX.
    - b. Johns Manville; 1000 Series Spin-Glas.
    - c. Owens Corning; High Temperature Industrial Board Insulations.
    - d. Rock Wool Manufacturing Company; Delta Board.
    - e. Roxul Inc.; Roxul RW.
    - f. Thermafiber; Thermafiber Industrial Felt.
- M. Mineral-Fiber, Preformed Pipe Insulation:
  - 1. Products: Subject to compliance with requirements, provide one of the following not:
    - a. Fibrex Insulations Inc.; Coreplus 1200.
    - b. Johns Manville; Micro-Lok.

- c. Knauf Insulation; 1000(Pipe Insulation.
  - d. Manson Insulation Inc.; Alley-K.
  - e. Owens Corning; Fiberglas Pipe Insulation.
2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, without factory-applied jacket with factory-applied ASJ with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- N. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ FSK jacket complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; CrimpWrap.
    - b. Johns Manville; MicroFlex.
    - c. Knauf Insulation; Pipe and Tank Insulation.
    - d. Manson Insulation Inc.; AK Flex.
    - e. Owens Corning; Fiberglas Pipe and Tank Insulation.
- O. Phenolic:
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Kingspan Corp.; Koolphen K.
  - 2. Preformed pipe insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type III, Grade 1.
  - 3. Block insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type II, Grade 1.
  - 4. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
  - 5. Factory-Applied Jacket: Requirements are specified in "Factory-Applied Jackets" Article.
    - a. Preformed Pipe Insulation: None ASJ.
    - b. Board for Equipment Applications: None ASJ.
- P. Polyisocyanurate: Unfaced, preformed, rigid cellular polyisocyanurate material intended for use as thermal insulation.
- 1. Products: Subject to compliance with requirements, provide one of the following not:
    - a. Apache Products Company; ISO-25.
    - b. Dow Chemical Company (The); Trymer.
    - c. Duna USA Inc.; Corafoam.
    - d. Elliott Company; Elfoam.
  - 2. Comply with ASTM C 591, Type I or Type IV, except thermal conductivity (k-value) shall not exceed 0.19 Btu x in./h x sq. ft. x deg F at 75 deg F after 180 days of aging.
  - 3. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to 1-1/2 inches as tested by ASTM E 84.
  - 4. Fabricate shapes according to ASTM C 450 and ASTM C 585.

5. Factory-Applied Jacket: Requirements are specified in "Factory-Applied Jackets" Article.

- a. Pipe Applications: None ASJ ASJ-SSL PVDC PVDC-SSL.
- b. Equipment Applications: None ASJ ASJ-SSL PVDC PVDC-SSL.

Q. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Armacell LLC; Tubolit.
- b. Nomaco Inc.; IMCOLOCK, IMCOSHEET, NOMALOCK, and NOMAPLY.
- c. RBX Corporation; Therma-cell.

R. Polystyrene: Rigid, extruded cellular polystyrene intended for use as thermal insulation. Comply with ASTM C 578, Type IV or Type XIII, except thermal conductivity (k-value) shall not exceed 0.26 Btu x in./h x sq. ft. x deg F after 180 days of aging. Fabricate shapes according to ASTM C 450 and ASTM C 585.

1. Products: Subject to compliance with requirements, provide one of the following not:

- a. Dow Chemical Company (The); Styrofoam.
- b. Knauf Insulation; Knauf Polystyrene.

## 2.2 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Insulco, Division of MFS, Inc.; Triple I.
- b. P. K. Insulation Mfg. Co., Inc.; Super-Stik.

B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. P. K. Insulation Mfg. Co., Inc.; Thermal-V-Kote.
- b.

C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Insulco, Division of MFS, Inc.; SmoothKote.
- b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
- c. Rock Wool Manufacturing Company; Delta One Shot.

## 2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

- B. Calcium Silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 to 800 deg F.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-97.
    - b. Foster Products Corporation, H. B. Fuller Company; 81-27/81-93.
    - c. Marathon Industries, Inc.; 290.
    - d. Mon-Eco Industries, Inc.; 22-30.
    - e. Vimasco Corporation; 760.
  2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Cellular-Glass, Phenolic, Polyisocyanurate, and Polystyrene Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-96.
    - b. Foster Products Corporation, H. B. Fuller Company; 81-33.
  2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA Inc.; Aeroseal.
    - b. Armacell LCC; 520 Adhesive.
    - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
    - d. RBX Corporation; Rubatex Contact Adhesive.
  2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.
  2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Polystyrene Adhesive: Solvent- or water-based, synthetic resin adhesive with a service temperature range of minus 20 to plus 140 deg F.
1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; CP-96.
  - b. Foster Products Corporation, H. B. Fuller Company; 97-13.
- G. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.
  - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- H. PVC Jacket Adhesive: Compatible with PVC jacket.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Chemical Company (The); 739, Dow Silicone.
    - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
    - c. P.I.C. Plastics, Inc.; Welding Adhesive.
    - d. Speedline Corporation; Speedline Vinyl Adhesive.
  - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
- 1. For indoor applications, use mastics that have a VOC content of g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-35.
    - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
    - c. ITW TACC, Division of Illinois Tool Works; CB-50.
    - d. Marathon Industries, Inc.; 590.
    - e. Mon-Eco Industries, Inc.; 55-40.
    - f. Vimasco Corporation; 749.
  - 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
  - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
  - 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
  - 5. Color: White.

C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-30.
  - b. Foster Products Corporation, H. B. Fuller Company; 30-35.
  - c. ITW TACC, Division of Illinois Tool Works; CB-25.
  - d. Marathon Industries, Inc.; 501.
  - e. Mon-Eco Industries, Inc.; 55-10.
2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; Encacel.
  - b. Foster Products Corporation, H. B. Fuller Company; 60-95/60-96.
  - c. Marathon Industries, Inc.; 570.
  - d. Mon-Eco Industries, Inc.; 55-70.
2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-10.
  - b. Foster Products Corporation, H. B. Fuller Company; 35-00.
  - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
  - d. Marathon Industries, Inc.; 550.
  - e. Mon-Eco Industries, Inc.; 55-50.
  - f. Vimasco Corporation; WC-1/WC-5.
2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 200 deg F.
4. Solids Content: 63 percent by volume and 73 percent by weight.
5. Color: White.

## 2.5 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-52.

- b. Foster Products Corporation, H. B. Fuller Company; 81-42.
  - c. Marathon Industries, Inc.; 130.
  - d. Mon-Eco Industries, Inc.; 11-30.
  - e. Vimasco Corporation; 136.
- 3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over equipment and pipe insulation.
  - 4. Service Temperature Range: Minus 50 to plus 180 deg F.
  - 5. Color: White.

## 2.6 SEALANTS

### A. Joint Sealants:

- 1. Joint Sealants for Cellular-Glass, Phenolic, and Polyisocyanurate Products: Subject to compliance with requirements, provide one of the following the Work include, but are:
  - a. Childers Products, Division of ITW; CP-76.
  - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Pittsburgh Corning Corporation; Pittseal 444.
  - f. Vimasco Corporation; 750.
- 2. Joint Sealants for Polystyrene Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-70.
  - b. Foster Products Corporation, H. B. Fuller Company; 30-45/30-46.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Vimasco Corporation; 750.
- 3. Materials shall be compatible with insulation materials, jackets, and substrates.
- 4. Permanently flexible, elastomeric sealant.
- 5. Service Temperature Range: Minus 100 to plus 300 deg F.
- 6. Color: White or gray.
- 7. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### B. FSK and Metal Jacket Flashing Sealants:

- 1. Products: Subject to compliance with requirements, provide one of the following not:
  - a. Childers Products, Division of ITW; CP-76-8.
  - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Vimasco Corporation; 750.
  - f.
- 2. Materials shall be compatible with insulation materials, jackets, and substrates.
- 3. Fire- and water-resistant, flexible, elastomeric sealant.
- 4. Service Temperature Range: Minus 40 to plus 250 deg F.
- 5. Color: Aluminum.

6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. PVDC Jacket for Indoor Applications: 4-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.
5. PVDC Jacket for Outdoor Applications: 6-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.
6. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

## 2.8 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Fabric for Pipe Insulation: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. inch for covering pipe and pipe fittings.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Vimasco Corporation; Elastafab 894.
- B. Woven Glass-Fiber Fabric for Equipment Insulation: Approximately 6 oz./sq. yd. with a thread count of 5 strands by 5 strands/sq. inch for covering equipment.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; Chil-Glas No. 5.
- C. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. inch, in a Leno weave, for equipment and pipe.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Foster Products Corporation, H. B. Fuller Company; Mast-A-Fab.
    - b. Vimasco Corporation; Elastafab 894.

## 2.9 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd..
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Alpha Associates, Inc.; Alpha-Maritex 84215 and 84217/9485RW, Luben 59.

## 2.10 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Johns Manville; Zeston.
    - b. P.I.C. Plastics, Inc.; FG Series.
    - c. Proto PVC Corporation; LoSmoke.
    - d. Speedline Corporation; SmokeSafe.
  - 2. Adhesive: As recommended by jacket material manufacturer.
  - 3. Color: White Color-code jackets based on system. Color as selected by Commissioner.
  - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
    - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

5. Factory-fabricated tank heads and tank side panels.

C. Metal Jacket:

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; Metal Jacketing Systems.
- b. PABCO Metals Corporation; Surefit.
- c. RPR Products, Inc.; Insul-Mate.

2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.

- a. Sheet and roll stock ready for shop or field sizing Factory cut and rolled to size.
- b. Finish and thickness are indicated in field-applied jacket schedules.
- c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil-thick Polysurlyn.
- d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil- thick Polysurlyn.
- e. Factory-Fabricated Fitting Covers:
  - 1) Same material, finish, and thickness as jacket.
  - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
  - 3) Tee covers.
  - 4) Flange and union covers.
  - 5) End caps.
  - 6) Beveled collars.
  - 7) Valve covers.
  - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

3. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.

- a. Sheet and roll stock ready for shop or field sizing Factory cut and rolled to size.
- b. Material, finish, and thickness are indicated in field-applied jacket schedules.
- c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil-thick Polysurlyn.
- d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil- thick Polysurlyn.
- e. Factory-Fabricated Fitting Covers:
  - 1) Same material, finish, and thickness as jacket.
  - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
  - 3) Tee covers.
  - 4) Flange and union covers.
  - 5) End caps.
  - 6) Beveled collars.
  - 7) Valve covers.
  - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

- D. Underground Direct-Buried Jacket: 125-mil- thick vapor barrier and waterproofing membrane consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Pittsburgh Corning Corporation; Pittwrap.
- b. Polyguard; Insulrap No Torch 125.

## 2.11 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
- b. Compac Corp.; 104 and 105.
- c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
- d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.

3. Thickness: 11.5 mils.

4. Adhesion: 90 ounces force/inch in width.

5. Elongation: 2 percent.

6. Tensile Strength: 40 lbf/inch in width.

7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
- b. Compac Corp.; 110 and 111.
- c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
- d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches.

3. Thickness: 6.5 mils.

4. Adhesion: 90 ounces force/inch in width.

5. Elongation: 2 percent.

6. Tensile Strength: 40 lbf/inch in width.

7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
- b. Compac Corp.; 130.
- c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
- d. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
  - b. Compac Corp.; 120.
  - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
  - d. Venture Tape; 3520 CW.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

E. PVDC Tape: White vapor-retarder PVDC tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Dow Chemical Company (The); Saran 540 Vapor Retarder Tape.
2. Width: 3 inches.
3. Film Thickness: 4 mils 6 mils.
4. Adhesive Thickness: 1.5 mils.
5. Elongation at Break: 145 percent.
6. Tensile Strength: 55 lbf/inch in width.

## 2.12 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products; Bands.
  - b. PABCO Metals Corporation; Bands.
  - c. RPR Products, Inc.; Bands.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 316 304 or Type 316; 0.015 inch thick, 1/2 inch 3/4 inch wide with wing seal closed seal wing or closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch 3/4 inch wide with wing seal closed seal wing or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- 0.135-inch- diameter shank, length to suit depth of insulation indicated.

- a. Products: Subject to compliance with requirements, provide one of the following:
  - 1) AGM Industries, Inc.; CWP-1.
  - 2) GEMCO; CD.
  - 3) Midwest Fasteners, Inc.; CD.
  - 4) Nelson Stud Welding; TPA, TPC, and TPS.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- 0.135-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) AGM Industries, Inc.; CWP-1.
    - 2) GEMCO; Cupped Head Weld Pin.
    - 3) Midwest Fasteners, Inc.; Cupped Head.
    - 4) Nelson Stud Welding; CHP.
3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
    - 2) GEMCO; Perforated Base.
    - 3) Midwest Fasteners, Inc.; Spindle.
  - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - c. Spindle: Copper- or zinc-coated, low carbon steel Aluminum Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) GEMCO; Nylon Hangers.
    - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
  - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
  - c. Spindle: Nylon, 0.106-inch- diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series TSA.
    - 2) GEMCO; Press and Peel.
    - 3) Midwest Fasteners, Inc.; Self Stick.
  - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - c. Spindle: Copper- or zinc-coated, low carbon steel Aluminum Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
  - d. Adhesive-backed base with a peel-off protective cover.
  
6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel aluminum stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) AGM Industries, Inc.; RC-150.
    - 2) GEMCO; R-150.
    - 3) Midwest Fasteners, Inc.; WA-150.
    - 4) Nelson Stud Welding; Speed Clips.
  - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
  
7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) GEMCO.
    - 2) Midwest Fasteners, Inc.
  
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
  
- D. Wire: 0.080-inch nickel-copper alloy 0.062-inch soft-annealed, stainless steel 0.062-inch soft-annealed, galvanized steel.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. C & F Wire.
    - b. Childers Products.
    - c. PABCO Metals Corporation.
    - d. RPR Products, Inc.

## 2.13 CORNER ANGLES

- A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.
- C. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 316 304 or 316.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
  - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
  - 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### 3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.

- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.
  - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches 4 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
  - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
  - 1. Vibration-control devices.
  - 2. Testing agency labels and stamps.
  - 3. Nameplates and data plates.
  - 4. Manholes.
  - 5. Handholes.
  - 6. Cleanouts.

### 3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
  - 1. Comply with requirements in Division 07 Section "Penetration Firestopping" firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
  - 1. Pipe: Install insulation continuously through floor penetrations.

2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

### 3.5 EQUIPMENT, TANK, AND VESSEL INSULATION INSTALLATION

#### A. Mineral Fiber, Pipe and Tank Insulation Installation for Tanks and Vessels: Secure insulation with adhesive and anchor pins and speed washers.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of tank and vessel surfaces.
2. Groove and score insulation materials to fit as closely as possible to equipment, including contours. Bevel insulation edges for cylindrical surfaces for tight joints. Stagger end joints.
3. Protect exposed corners with secured corner angles.
4. Install adhesively attached or self-sticking insulation hangers and speed washers on sides of tanks and vessels as follows:
  - a. Do not weld anchor pins to ASME-labeled pressure vessels.
  - b. Select insulation hangers and adhesive that are compatible with service temperature and with substrate.
  - c. On tanks and vessels, maximum anchor-pin spacing is 3 inches from insulation end joints, and 16 inches o.c. in both directions.
  - d. Do not overcompress insulation during installation.
  - e. Cut and miter insulation segments to fit curved sides and domed heads of tanks and vessels.
  - f. Impale insulation over anchor pins and attach speed washers.
  - g. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
5. Secure each layer of insulation with stainless-steel or aluminum bands. Select band material compatible with insulation materials.
6. Where insulation hangers on equipment and vessels are not permitted or practical and where insulation support rings are not provided, install a girdle network for securing insulation. Stretch prestressed aircraft cable around the diameter of vessel and make taut with clamps, turnbuckles, or breather springs. Place one circumferential girdle around equipment approximately 6 inches from each end. Install wire or cable between two circumferential girdles 12 inches o.c. Install a wire ring around each end and around outer periphery of center openings, and stretch prestressed aircraft cable radially from the wire ring to nearest circumferential girdle. Install additional circumferential girdles along the body of equipment or tank at a minimum spacing of 48 inches o.c. Use this network for securing insulation with tie wire or bands.
7. Stagger joints between insulation layers at least 3 inches.
8. Install insulation in removable segments on equipment access doors, manholes, handholes, and other elements that require frequent removal for service and inspection.
9. Bevel and seal insulation ends around manholes, handholes, ASME stamps, and nameplates.
10. For equipment with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.

#### B. Flexible Elastomeric Thermal Insulation Installation for Tanks and Vessels: Install insulation over entire surface of tanks and vessels.

1. Apply 100 percent coverage of adhesive to surface with manufacturer's recommended adhesive.
2. Seal longitudinal seams and end joints.

C. Insulation Installation on Pumps:

1. Fabricate metal boxes lined with insulation. Fit boxes around pumps and coincide box joints with splits in pump casings. Fabricate joints with outward bolted flanges. Bolt flanges on 6-inch centers, starting at corners. Install 3/8-inch- diameter fasteners with wing nuts. Alternatively, secure the box sections together using a latching mechanism.
2. Fabricate boxes from galvanized steel aluminum stainless steel, at least 0.040 inch 0.050 inch 0.060 inch thick.
3. For below ambient services, install a vapor barrier at seams, joints, and penetrations. Seal between flanges with replaceable gasket material to form a vapor barrier.

3.6 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.

- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
  - 1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  - 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
  - 3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
  - 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
  - 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

### 3.7 CALCIUM SILICATE INSULATION INSTALLATION

#### A. Insulation Installation on Domestic Water Boiler Breechings:

- 1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation material.
- 2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.
- 3. On exposed applications without metal jacket, finish insulation surface with a skim coat of mineral-fiber, hydraulic-setting cement. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth. Overlap edges at least 1 inch. Apply finish coat of lagging adhesive over glass cloth. Thin finish coat to achieve smooth, uniform finish.

#### B. Insulation Installation on Straight Pipes and Tubes:

- 1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation materials.
- 2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.
- 3. Apply a skim coat of mineral-fiber, hydraulic-setting cement to insulation surface. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth or tape. Overlap edges at least 1 inch. Apply finish coat of lagging adhesive over glass cloth or tape. Thin finish coat to achieve smooth, uniform finish.

#### C. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as pipe insulation.
4. Finish flange insulation same as pipe insulation.

D. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed insulation sections of insulation are not available, install mitered sections of calcium silicate insulation. Secure insulation materials with wire or bands.
3. Finish fittings insulation same as pipe insulation.

E. Insulation Installation on Valves and Pipe Specialties:

1. Install mitered segments of calcium silicate insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
2. Install insulation to flanges as specified for flange insulation application.
3. Finish valve and specialty insulation same as pipe insulation.

### 3.8 CELLULAR-GLASS INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.9 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.10 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

### 3.11 PHENOLIC INSULATION INSTALLATION

A. General Installation Requirements:

1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation materials.
2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with 0.062-inch wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.

B. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets with vapor retarders on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

C. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.

2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as pipe insulation.

D. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

E. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

### 3.12 POLYISOCYANURATE INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with tape or bands and tighten without deforming insulation materials. Orient longitudinal joints between half sections in 3 and 9 o'clock positions on the pipe.
2. For insulation with factory-applied jackets with vapor barriers, do not staple longitudinal tabs but secure tabs with additional adhesive or tape as recommended by insulation material manufacturer and seal with vapor-barrier mastic.
3. All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor barrier must be continuous. Before installing jacket material, install vapor-barrier system.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, same thickness of adjacent pipe insulation, not to exceed 1-1/2-inch thickness.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyisocyanurate block insulation of same thickness as pipe insulation.

C. Insulation Installation on Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of polyisocyanurate insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

### 3.13 POLYOLEFIN INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

#### B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

#### C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

#### D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

### 3.14 POLYSTYRENE INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation with tape or bands and tighten bands without deforming insulation materials. Orient longitudinal joints between half sections in 3 and 9 o'clock positions on the pipe.
2. For insulation with factory-applied jackets with vapor barriers, do not staple longitudinal tabs but secure tabs with additional adhesive or tape as recommended by insulation material manufacturer and seal with vapor-barrier mastic.
3. All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor barrier must be continuous. Before installing jacket material, install vapor-barrier system.

#### B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, same thickness of adjacent pipe insulation, not to exceed 1-1/2-inch thickness.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polystyrene block insulation of same thickness as pipe insulation.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed section of polystyrene insulation to valve body.
  2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  3. Install insulation to flanges as specified for flange insulation application.

### 3.15 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
  2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
  3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
1. Draw jacket material smooth and tight.
  2. Install lap or joint strips with same material as jacket.
  3. Secure jacket to insulation with manufacturer's recommended adhesive.
  4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
  5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.
- E. Where PVDC jackets are indicated, install as follows:
1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
  2. Wrap factory-presizes jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install presized jacket with an approximate overlap at butt joint of 2 inches over the previous section. Adhere lap seal using

- adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.
3. Continuous jacket can be spiral wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
  4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches or less. The 33-1/2-inch- circumference limit allows for 2-inch- overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
  5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

### 3.16 FINISHES

- A. Equipment and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
  1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
    - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Commissioner. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

### 3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  1. Inspect field-insulated equipment, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.
  2. Inspect pipe, fittings, strainers, and valves, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

### 3.18 EQUIPMENT INSULATION SCHEDULE

- A. Insulation materials and thicknesses are identified below. If more than one material is listed for a type of equipment, selection from materials listed is Contractor's option.
- B. Insulate indoor and outdoor equipment in paragraphs below that is not factory insulated.
- C. Domestic hot-water pump insulation shall be one of the following:
  - 1. Cellular Glass: 2 inchesthick.
  - 2. Mineral-Fiber Board: 1 inchthick and 2-lb/cu. ft. 3-lb/cu. ft. 6-lb/cu. ft. nominal density.
  - 3. Phenolic: 1 inchthick.
  - 4. Polyisocyanurate: 1 inchthick.
- D. Domestic water, domestic hot-water hydropneumatic tank insulation shall be one of the following:
  - 1. Cellular Glass: 1-1/2 inchesthick.
  - 2. Flexible Elastomeric: 1 inchthick.
  - 3. Mineral-Fiber Board: 1 inchthick and 2-lb/cu. ft. 3-lb/cu. ft. 6-lb/cu. ft. nominal density.
  - 4. Mineral-Fiber Pipe and Tank: 1 inchthick.
  - 5. Phenolic: 1 inchthick.
  - 6. Polyisocyanurate: 1 inchthick.
  - 7. Polyolefin: 1 inchthick.
- E. Domestic hot-water storage tank insulation shall be one of the following, of thickness to provide an R-value of 12.5:
  - 1. Cellular glass.
  - 2. Mineral-Fiber Board: 2-lb/cu. ft. 3-lb/cu. ft. 6-lb/cu. ft. nominal density.
  - 3. Mineral-fiber pipe and tank.
  - 4. Phenolic.
- F. Domestic water storage tank insulation shall be one of the following:
  - 1. Cellular Glass: 2 inchesthick.
  - 2. Flexible Elastomeric: 1 inchthick.
  - 3. Mineral-Fiber Board: 1 inchthick and 2-lb/cu. ft. 3-lb/cu. ft. 6-lb/cu. ft. nominal density.
  - 4. Mineral-Fiber Pipe and Tank: 1 inchthick.
  - 5. Phenolic: 1 inchthick.
  - 6. Polyisocyanurate: 1 inchthick.
  - 7. Polyolefin: 1 inchthick.

### 3.19 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  - 1. Underground piping.
  - 2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

### 3.20 INDOOR PIPING INSULATION SCHEDULE

#### A. Domestic Cold Water:

1. NPS 1 and Smaller: Insulation shall be one of the following:
  - a. Cellular Glass: 1-1/2 inchesthick.
  - b. Flexible Elastomeric: 1/2 inch 3/4 inch 1 inchthick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch 1 inchthick.
  - d. Phenolic: 1 inchthick.
  - e. Polyisocyanurate: 1 inchthick.
  - f. Polyolefin: 1/2 inch 3/4 inch 1 inchthick.
2. NPS 1-1/4 and Larger: Insulation shall be one of the following:
  - a. Cellular Glass: 1-1/2 inchesthick.
  - b. Flexible Elastomeric: 1 inchthick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inchthick.
  - d. Phenolic: 1 inchthick.
  - e. Polyisocyanurate: 1 inchthick.
  - f. Polyolefin: 1 inchthick.

#### B. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
  - a. Cellular Glass: 1-1/2 inchesthick.
  - b. Flexible Elastomeric: 3/4 inch 1 inchthick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch 1 inchthick.
  - d. Phenolic: 1 inchthick.
  - e. Polyisocyanurate: 1 inchthick.
  - f. Polyolefin: 3/4 inch 1 inchthick.
2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
  - a. Cellular Glass: 1-1/2 inchesthick.
  - b. Flexible Elastomeric: 1 inchthick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inchthick.
  - d. Phenolic: 1 inchthick.
  - e. Polyisocyanurate: 1 inchthick.
  - f. Polyolefin: 1 inchthick.

#### C. Stormwater and Overflow:

1. All Pipe Sizes: Insulation shall be one of the following:
  - a. Cellular Glass: 1-1/2 inchesthick.
  - b. Flexible Elastomeric: 1 inchthick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inchthick.
  - d. Phenolic: 1 inchthick.
  - e. Polyisocyanurate: 1 inchthick.
  - f. Polyolefin: 1 inchthick.

#### D. Roof Drain and Overflow Drain Bodies:

1. All Pipe Sizes: Insulation shall be one of the following:
  - a. Cellular Glass: 1-1/2 inchesthick.
  - b. Flexible Elastomeric: 1 inchthick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inchthick.
  - d. Phenolic: 1 inchthick.
  - e. Polyisocyanurate: 1 inchthick.
  - f. Polyolefin: 1 inchthick.
  
- E. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
  1. All Pipe Sizes: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 1/2 inch 3/4 inch 1 inchthick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch 1 inchthick.
    - c. Polyolefin: 1/2 inch 3/4 inch 1 inchthick.
  
- F. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:
  1. All Pipe Sizes: Insulation shall be one of the following:
    - a. Cellular Glass: 1-1/2 inchesthick.
    - b. Flexible Elastomeric: 3/4 inch 1 inchthick.
    - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch 1 inchthick.
    - d. Phenolic: 1 inchthick.
    - e. Polyisocyanurate: 1 inchthick.
    - f. Polyolefin: 3/4 inch 1 inchthick.

### 3.21 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Equipment, Concealed:
  1. None.
  2. PVC PVC, Color-Coded by System: 20 mils 30 mils thick.
  3. Aluminum, Smooth Corrugated Stucco Embossed: 0.016 inch 0.020 inch 0.024 inch 0.032 inch 0.040 inch thick.
  4. Painted Aluminum, Smooth Corrugated Stucco Embossed: 0.016 inch 0.020 inch 0.024 inch 0.032 inch thick.
  5. Stainless Steel, Type 304 316 304 or 316, Smooth 2B Finish Corrugated Stucco Embossed: 0.010 inch 0.016 inch 0.020 inch 0.024 inch thick.
- D. Piping, Concealed:
  1. None.
  2. PVC PVC, Color-Coded by System: 20 mils 30 mils thick.
  3. Aluminum, Smooth Corrugated Stucco Embossed: 0.016 inch 0.020 inch 0.024 inch 0.032 inch 0.040 inch thick.

4. Painted Aluminum, Smooth Corrugated Stucco Embossed: 0.016 inch 0.020 inch 0.024 inch 0.032 inch thick.
5. Stainless Steel, Type 304 316 304 or 316, Smooth 2B Finish Corrugated Stucco Embossed: 0.010 inch 0.016 inch 0.020 inch 0.024 inch thick.

E. Piping, Exposed:

1. None.
2. PVC PVC, Color-Coded by System: 20 mils 30 mils thick.
3. Aluminum, Smooth Corrugated Stucco Embossed: 0.016 inch 0.020 inch 0.024 inch 0.032 inch 0.040 inch thick.
4. Painted Aluminum, Smooth Corrugated Stucco Embossed: 0.016 inch 0.020 inch 0.024 inch 0.032 inch thick.
5. Stainless Steel, Type 304 316 304 or 316, Smooth 2B Finish Corrugated Stucco Embossed: 0.010 inch 0.016 inch 0.020 inch 0.024 inch thick.

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## SECTION 221113

### FACILITY WATER DISTRIBUTION PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service, fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

##### 1.3 DEFINITIONS

- A. EPDM: Ethylene propylene diene terpolymer rubber.
- B. LLDPE: Linear, low-density polyethylene plastic.
- C. PA: Polyamide (nylon) plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. RTRF: Reinforced thermosetting resin (fiberglass) fittings.
- H. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
  - 1. Wiring Diagrams: Power, signal, and control wiring for alarms.
- C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

## 1.5 QUALITY ASSURANCE

### A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

### B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

### C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

### D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

### E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

### F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

### G. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

## 1.6 DELIVERY, STORAGE, AND HANDLING

### A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

### B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

## 1.7 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by The City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
  1. Notify Commissioner no fewer than two days in advance of proposed interruption of service.
  2. Do not proceed with interruption of water-distribution service without Commissioner's written permission.

## 1.8 COORDINATION

- A. Coordinate connection to water main with utility company.

## PART 2 - PRODUCTS

### 2.1 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Type K and ASTM B 88, Type L, water tube, annealed temper.
  1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
  2. Copper, Pressure-Seal Fittings:
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Viega; Plumbing & Heating Systems.
    - c. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.

- d. NPS 2-1/2 to NPS 4: Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.
- B. Hard Copper Tube: ASTM B 88, Type K and ASTM B 88, Type L, water tube, drawn temper.
- 1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
  - 2. Copper, Pressure-Seal Fittings:
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Viega; Plumbing & Heating Systems.
      - 2)
    - c. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
    - d. NPS 2-1/2 to NPS 4: Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.
- C. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
- D. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

## 2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
- 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
  - 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
- 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
  - 2. Gaskets: AWWA C111, rubber.
- C. Grooved-Joint, Ductile-Iron Pipe: AWWA C151, with cut, rounded-grooved ends.
- 1. Grooved-End, Ductile-Iron Pipe Appurtenances:
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1) Anvil International, Inc.
  - 2) Victaulic Company of America.
- c. Grooved-End, Ductile-Iron Fittings: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.
- d. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

D. Flanges: ASME 16.1, Class 125, cast iron.

### 2.3 PE PIPE AND FITTINGS

- A. PE, ASTM Pipe: ASTM D 2239, SDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than 160 psig 200 psig.
  - 1. Insert Fittings for PE Pipe: ASTM D 2609, made of PA, PP, or PVC with serrated male insert ends matching inside of pipe. Include bands or crimp rings.
  - 2. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.
- B. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than 160 psig 200 psig.
  - 1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than 160 psig 200 psig.
- C. PE, Fire-Service Pipe: ASTM F 714, AWWA C906, or equivalent for PE water pipe; FMG approved, with minimum thickness equivalent to FMG Class 150 and Class 200.
  - 1. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

### 2.4 SPECIAL PIPE FITTINGS

- A. Ductile-Iron Rigid Expansion Joints:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. EBAA Iron, Inc.
    - b. U.S. Pipe and Foundry Company.
    - c.
  - 3. Description: Three-piece, ductile-iron assembly consisting of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with

AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

- a. Pressure Rating: 250 psig minimum.
- b. Expansion Required:

B. Ductile-Iron Flexible Expansion Joints:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. EBAA Iron, Inc.
  - b. Hays Fluid Controls; a division of ROMAC Industries Inc.
  - c. Star Pipe Products.
3. Description: Compound, ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections. Assemble components for offset and expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
  - a. Pressure Rating: 250 psig minimum.
  - b. Offset:
  - c. Expansion Required:

C. Ductile-Iron Deflection Fittings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. EBAA Iron, Inc.
3. Description: Compound, ductile-iron coupling fitting with sleeve and 1 or 2 flexing sections for up to 15-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
  - a. Pressure Rating: 250 psig minimum.

2.5 JOINING MATERIALS

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for commonly used joining materials.
- B. Brazing Filler Metals: AWS A5.8, BCuP Series.
- C. Bonding Adhesive for Fiberglass Piping: As recommended by fiberglass piping manufacturer.

- D. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

## 2.6 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

- B. Tubular-Sleeve Pipe Couplings:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Cascade Waterworks Manufacturing.
- b. Dresser, Inc.; Dresser Piping Specialties.
- c. Ford Meter Box Company, Inc. (The); Pipe Products Div.
- d. Hays Fluid Controls; a division of ROMAC Industries Inc.
- e. JCM Industries.
- f. Smith-Blair, Inc.
- g. Viking Johnson.

- 3. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.

- a. Standard: AWWA C219.
- b. Center-Sleeve Material: Manufacturer's standard Carbon steel Stainless steel Ductile iron Malleable iron.
- c. Gasket Material: Natural or synthetic rubber.
- d. Pressure Rating: 150 psig 200 psig minimum.
- e. Metal Component Finish: Corrosion-resistant coating or material.

- C. Split-Sleeve Pipe Couplings:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Victaulic Depend-O-Lok.

- 3. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.

- a. Standard: AWWA C219.
- b. Sleeve Material: Manufacturer's standard Carbon steel Stainless steel.
- c. Sleeve Dimensions: Of thickness and width required to provide pressure rating.
- d. Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
- e. Pressure Rating: 150 psig 200 psig minimum.
- f. Metal Component Finish: Corrosion-resistant coating or material.

D. Flexible Connectors:

1. Nonferrous-Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends brazed to hose.
2. Ferrous-Metal Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1, threaded steel pipe nipples or ASME B16.5, steel pipe flanges welded to hose.

E. Dielectric Fittings: Combination of copper alloy and ferrous; threaded, solder, or plain end types; and matching piping system materials.

1. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig minimum working pressure at 180 deg F. Include insulating material that isolates dissimilar metals and ends with inside threads according to ASME B1.20.1.
2. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig minimum working pressure to suit system pressures.
3. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
  - a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure to suit system pressures.
4. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig minimum working pressure at 225 deg F.
5. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types, and 300-psig minimum working pressure at 225 deg F.

## 2.7 CORPORATION VALVES AND CURB VALVES

A. Manufacturers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Amcast Industrial Corporation; Lee Brass Co.
  - b. Ford Meter Box Company, Inc. (The); Pipe Products Div.
  - c. Jones, James Company.
  - d. Master Meter, Inc.
  - e. McDonald, A. Y. Mfg. Co.
  - f. Mueller Co.; Water Products Div.
  - g. Red Hed Manufacturing & Supply.

B. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.

1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.

2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.
  3. Manifold: Copper fitting with two to four inlets as required, with ends matching corporation valves and outlet matching service piping material.
- C. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.
- D. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over curb valve and with a barrel approximately 3 inches in diameter.
1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.
- E. Water Control Valves:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
    - a. CLA-VAL Automatic Control Valves.
    - b. Flomatic Corporation.
    - c. OCV Control Valves.
    - d. Watts Regulator Co.; Ames Fluid Control Systems.
    - e. Watts Regulator Co.; Watts ACV Division.
    - f. Zurn Plumbing Products Group; Wilkins Water Control Products Div.
  4. Description: Pilot-operation, diaphragm-type, single-seated main water control valve with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot control valve, restrictor device, specialty fittings, and sensor piping.
    - a. Pressure Rating: Initial pressure of 150 psig minimum.
    - b. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.
      - 1) Size:
      - 2) Pattern: Angle Globe-valve design.
      - 3) Trim: Stainless steel.
    - c. Design Flow Rate:
    - d. Design Inlet Pressure
    - e. Design Outlet Pressure Setting
    - f. End Connections: Threaded for NPS 2 and smaller; flanged <Insert type> for NPS 2-1/2 and larger.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

### 3.2 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 4 to NPS 8 shall be any of the following:
  - 1. Soft copper tube, ASTM B 88, Type K ASTM B 88, Type L; wrought-copper, solder-joint fittings; and brazed joints.
  - 2. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.
  - 3. PE, AWWA pipe; PE, AWWA fittings; and heat-fusion joints.
  - 4. PVC, Schedule 40 pipe; PVC, Schedule 40 80 pipe; PVC, Schedule 80 socket fittings; and solvent-cemented joints.
  - 5. NPS 4 and NPS 6: PVC, AWWA Class 150 pipe; PVC, AWWA Class 150 fabricated or molded fittings; and gasketed joints.
  - 6. NPS 8: PVC, AWWA Class 200 pipe; PVC, AWWA Class 200 fabricated push-on-joint, ductile-iron mechanical-joint, ductile-iron fittings; and gasketed joints.
  - 7. Fiberglass, AWWA RTRP, Class 150 200 250; RTRF; and bonded joints.
- F. Underground Fire-Service-Main Piping NPS 4 to NPS 12 shall be any of the following:
  - 1. Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.
  - 2. PE, Class 150 200, fire-service pipe; molded PE fittings; and heat-fusion joints.
  - 3. PVC, AWWA Class 150 pipe listed for fire-protection service; PVC Class 150 fabricated or molded fittings; and gasketed joints.
  - 4. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC Class 200 fabricated fittings; and gasketed joints.
  - 5. Fiberglass, AWWA, FMG-approved RTRP, Class 150 200; RTRF; and gasketed joints.
  - 6. Fiberglass, UL RTRP, Class 150 200 250; RTRF; and gasketed joints.

### 3.3 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG,

nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.

### 3.4 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
- B. Underground fire-suppression water-service shutoff valves NPS 2 and smaller shall be curb valves with ends compatible with piping.
- C. Underground fire-suppression water-service shutoff valves NPS 3 and larger shall be one of the following:
  - 1. 200-psig, AWWA, iron, nonrising-stem, metal resilient-seated gate valves.
  - 2. 250-psig, AWWA, iron, nonrising-stem, resilient-seated gate valves.
  - 3. 175-psig 250-psig, UL-listed or FM-approved, iron, nonrising-stem gate valves.
- D. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  - 1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, metal resilient high-pressure, resilient-seated gate valves with valve box.
  - 2. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
  - 3. Use the following for valves in vaults and aboveground:
    - a. Gate Valves, NPS 2 and Smaller: Bronze, nonrising rising stem.
    - b. Gate Valves, NPS 3 and Larger: AWWA, cast iron, OS&Y rising stem, metal seated AWWA, cast iron, OS&Y rising stem, resilient seated UL/FMG, cast iron, OS&Y rising stem.
    - c. Check Valves: AWWA C508 UL/FMG, swing type.

### 3.5 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. See Division 22 Section "Common Work Results for Plumbing" for piping-system common requirements.

### 3.6 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
- C. Make connections larger than NPS 2 with tapping machine according to the following:
  - 1. Install tapping sleeve and tapping valve according to MSS SP-60.
  - 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
  - 3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.

4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
- D. Make connections NPS 2 and smaller with drilling machine according to the following:
1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
  2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
  3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
  4. Install corporation valves into service-saddle assemblies.
  5. Install manifold for multiple taps in water main.
  6. Install curb valve in water-service piping with head pointing up and with service box.
- E. Comply with NFPA 24 for fire-service-main piping materials and installation.
1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
  2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- F. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
- G. Install PE pipe according to ASTM D 2774 and ASTM F 645.
- H. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- I. Install fiberglass AWWA pipe according to AWWA M45.
- J. Bury piping with depth of cover over top at least 30 inches , with top at least 12 inches below level of maximum frost penetration, and according to the following:
1. Under Driveways: With at least 36 inches cover over top.
  2. Under Railroad Tracks: With at least 48 inches cover over top.
  3. In Loose Gravelly Soil and Rock: With at least 12 inches additional cover.
- K. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- L. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- M. Sleeves are specified in Division 22 Section "Common Work Results for Plumbing."
- N. Mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."
- O. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

- P. See Division 21 Section "Water-Based Fire-Suppression Systems" for fire-suppression-water piping inside the building.
- Q. See Division 22 Section "Domestic Water Piping" for potable-water piping inside the building.

### 3.7 SERVICE-ENTRANCE PIPING

- A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements for exterior piping called for in this Section.
- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Comply with requirements for backflow preventers in Division 21 Section "Facility Fire-Suppression Water-Service Piping."
- C. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

### 3.8 JOINT CONSTRUCTION

- A. See Division 22 Section "Common Work Results for Plumbing" for basic piping joint construction.
- B. Make pipe joints according to the following:
  - 1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
  - 2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
  - 3. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
  - 4. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.
  - 5. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
  - 6. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
  - 7. Fiberglass Piping Bonded Joints: Use adhesive and procedure recommended by piping manufacturer.
  - 8. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure. Refer to Division 22 Section "Common Work Results for Plumbing" for joining piping of dissimilar metals.

### 3.9 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
  - 1. Concrete thrust blocks.
  - 2. Locking mechanical joints.
  - 3. Set-screw mechanical retainer glands.
  - 4. Bolted flanged joints.
  - 5. Heat-fused joints.

6. Pipe clamps and tie rods.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
  1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
  2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
  3. Bonded-Joint Fiberglass, Water-Service Piping: According to AWWA M45.
  4. Fire-Service-Main Piping: According to NFPA 24.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

### 3.10 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.
- E. MSS Valves: Install as component of connected piping system.
- F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
- G. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. Install full-size valved bypass.
- H. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

### 3.11 DETECTOR-CHECK VALVE INSTALLATION

- A. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- B. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

### 3.12 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. See Division 22 Section "Common Work Results for Plumbing" for piping connections to valves and equipment.
- C. Connect water-distribution piping to utility water main existing water main . Use tapping sleeve and tapping valve service clamp and corporation valve .

- D. Connect water-distribution piping to interior domestic water and fire-suppression piping.
- E. Connect waste piping from concrete vault drains to sanitary sewerage system. See Division 22 Section "Facility Sanitary Sewers" for connection to sanitary-sewer storm-drainage system. See Division 33 Section "Storm Utility Drainage Piping" for connection to storm-sewer piping.
- F. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- G. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.13 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
  - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

### 3.14 IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section "Earth Moving."
- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Division 22 Section "Common Work Results for Plumbing" for identifying devices.

### 3.15 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
  - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
  - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
  - 3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

- a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
- b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
- c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
- d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION 221113

SECTION 221116  
DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Encasement for piping.
3. Specialty valves.
4. Flexible connectors.
5. Escutcheons.
6. Sleeves and sleeve seals.
7. Wall penetration systems.

B. Related Section:

1. Division 22 Section "Facility Water Distribution Piping" for water-service piping outside the building from source to the point where water-service piping enters the building.
2. Division 22 Section "Domestic Water Piping Specialties" for water meters inside the building.

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Domestic water piping and support and installation shall withstand effects of earthquake motions determined according to **ASCE/SEI 7**.

1.4 SUBMITTALS

A. Product Data: For the following products:

1. Specialty valves.
2. Transition fittings.
3. Dielectric fittings.
4. Flexible connectors.
5. Water meters.
6. **Backflow preventers and vacuum breakers.**
7. Escutcheons.
8. Sleeves and sleeve seals.

9. Water penetration systems.

B. LEED Submittal:

1. Product Data for Credit EQ 4.1: For solvent cements and adhesive primers, including printed statement of VOC content.

C. Water Samples: Specified in "Cleaning" Article.

D. Coordination Drawings: For piping in equipment rooms and other congested areas, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Fire-suppression-water piping.
2. Domestic water piping.
3. Compressed air piping.
4. HVAC hydronic piping.

E. Field quality-control reports.

#### 1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic, potable domestic water piping and components. **Include marking "NSF-pw" on piping.**

C. Comply with NSF 61 for potable domestic water piping and components.

#### 1.6 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by The City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Commissioner no fewer than two days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Commissioner's written permission.

#### 1.7 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

### PART 2 - PRODUCTS

#### 2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

## 2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: **ASTM B 88, Type L and ASTM B 88, Type M** water tube, drawn temper.
1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
  2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
  3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
  4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
  5. Copper Pressure-Seal-Joint Fittings:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Elkhart Products Corporation; Industrial Division.
      - 2) NIBCO INC.
      - 3) Viega; Plumbing and Heating Systems.
    - b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
    - c. NPS 2-1/2 to NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.
  6. Copper Push-on-Joint Fittings:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) NVent LLC.
    - b. Description: Cast-copper fitting complying with ASME B16.18 or wrought-copper fitting complying with ASME B 16.22; with stainless-steel teeth and EPDM-rubber O-ring seal in each end instead of solder-joint ends.
  7. Copper-Tube Extruded-Tee Connections:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) T-DRILL Industries Inc.
    - b. Description: Tee formed in copper tube according to ASTM F 2014.
  8. Grooved-Joint Copper-Tube Appurtenances:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Anvil International.
      - 2) Shurjoint Piping Products.
      - 3) Victaulic Company.

- b. Copper Grooved-End Fittings: ASTM B 75 copper tube or ASTM B 584 bronze castings.
  - c. Grooved-End-Tube Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, EPDM-rubber gaskets suitable for hot and cold water, and bolts and nuts.
- B. Soft Copper Tube: **ASTM B 88, Type K and ASTM B 88, Type L** water tube, annealed temper.
- 1. Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
  - 2. Copper Pressure-Seal-Joint Fittings:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Elkhart Products Corporation; Industrial Division.
      - 2) NIBCO INC.
      - 3) Viega; Plumbing and Heating Systems.
    - b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
    - c. NPS 3 and NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.

## 2.3 GALVANIZED-STEEL PIPE AND FITTINGS

- A. Galvanized-Steel Pipe: ASTM A 53/A 53M, **Type E , Grade B**, Standard Weight. Include ends matching joining method.
- 1. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106/A 106M, Standard Weight, seamless steel pipe with threaded ends.
  - 2. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
  - 3. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.
  - 4. Flanges: ASME B16.1, Class 125, cast iron.
  - 5. Grooved-Joint, Galvanized-Steel-Pipe Appurtenances:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Anvil International.
      - 2) Shurjoint Piping Products.
      - 3) Star Pipe Products.
      - 4) Victaulic Company.
    - b. Galvanized, Grooved-End Fittings for Galvanized-Steel Piping: ASTM A 47/A 47M, malleable-iron casting; ASTM A 106/A 106M, steel pipe; or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
    - c. Grooved-End-Pipe Couplings for Galvanized-Steel Piping: AWWA C606 for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gaskets suitable for hot and cold water, and bolts and nuts.

## 2.4 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105.
- B. Form: **Sheet or Tube.**
- C. Material: **LLDPE film of 0.008-inch LLDPE film of 0.008-inch minimum thickness or high-density, cross-laminated PE film of 0.004-inch High-density, cross-laminated PE film of 0.004-inch minimum thickness.**
- D. Color: **Black or Natural.**

## 2.5 SPECIALTY VALVES

- A. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.
- B. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

## 2.6 TRANSITION FITTINGS

- A. General Requirements:
  - 1. Same size as pipes to be joined.
  - 2. Pressure rating at least equal to pipes to be joined.
  - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cascade Waterworks Manufacturing.
    - b. Dresser, Inc.; Dresser Piping Specialties.
    - c. Ford Meter Box Company, Inc. (The).
    - d. JCM Industries.
    - e. Romac Industries, Inc.
    - f. Smith-Blair, Inc; a Sensus company.
    - g. Viking Johnson; c/o Mueller Co.

## 2.7 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.
- B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Capitol Manufacturing Company.
  - b. Central Plastics Company.
  - c. EPCO Sales, Inc.
  - d. Hart Industries International, Inc.
  - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - f. Zurn Plumbing Products Group; Wilkins Water Control Products.

2. Description:

- a. Pressure Rating: **150 psig 250 psig** at 180 deg F.
- b. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Capitol Manufacturing Company.
- b. Central Plastics Company.
- c. EPCO Sales, Inc.
- d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Factory-fabricated, bolted, companion-flange assembly.
- b. Pressure Rating: **150 psig**.
- c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Advance Products & Systems, Inc.
- b. Calpico, Inc.
- c. Central Plastics Company.
- d. Pipeline Seal and Insulator, Inc.

2. Description:

- a. Nonconducting materials for field assembly of companion flanges.
- b. Pressure Rating: **150 psig**.
- c. Gasket: Neoprene or phenolic.
- d. Bolt Sleeves: Phenolic or polyethylene.
- e. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Calpico, Inc.
  - b. Lochinvar Corporation.
2. Description:
  - a. Galvanized-steel coupling.
  - b. Pressure Rating: 300 psig at 225 deg F.
  - c. End Connections: Female threaded.
  - d. Lining: Inert and noncorrosive, thermoplastic.

F. Dielectric Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Perfection Corporation; a subsidiary of American Meter Company.
  - b. Precision Plumbing Products, Inc.
  - c. Victaulic Company.
2. Description:
  - a. Electroplated steel nipple complying with ASTM F 1545.
  - b. Pressure Rating: **300 psig at 225 deg F**
  - c. End Connections: Male threaded or grooved.
  - d. Lining: Inert and noncorrosive, propylene.

2.8 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Flex-Hose Co., Inc.
  2. Flexicraft Industries.
  3. Flex Pression, Ltd.
  4. Flex-Weld, Inc.
  5. Hyspan Precision Products, Inc.
  6. Mercer Rubber Co.
  7. Metraflex, Inc.
  8. Proco Products, Inc.
  9. Tozen Corporation.
  10. Unaflex, Inc.
  11. Universal Metal Hose; a Hyspan company
- B. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
1. Working-Pressure Rating: Minimum **200 psig 250 psig**.
  2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
  3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

- C. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
  - 1. Working-Pressure Rating: Minimum **200 psig 250 psig**.
  - 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
  - 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

## 2.9 ESCUTCHEONS

- A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.
- B. One Piece, Cast Brass: **Polished, chrome-plated or rough-brass** finish with setscrews.
- C. One Piece, Deep Pattern: Deep-drawn, box-shaped brass with chrome-plated finish.
- D. Split Casting, Cast Brass: **Polished, chrome-plated or rough-brass** finish with concealed hinge and setscrew.
- E. One-Piece Floor Plates: Cast-iron flange **with holes for fasteners**.
- F. Split-Casting Floor Plates: Cast brass with concealed hinge.

## 2.10 SLEEVES

- A. Cast-Iron Wall Pipes: Fabricated of cast iron, and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. Molded-PE Sleeves: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- D. Molded-PVC Sleeves: Permanent, with nailing flange for attaching to wooden forms.
- E. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- F. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.
- G. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with setscrews.

## 2.11 SLEEVE SEALS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.

3. Metraflex, Inc.
4. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.

1. Sealing Elements: **EPDM-rubber** interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: **Carbon steel** or **Stainless steel**.
3. Connecting Bolts and Nuts: **Carbon steel, with corrosion-resistant coating, or Stainless steel** of length required to secure pressure plates to sealing elements.

## 2.12 WALL PENETRATION SYSTEMS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. SIGMA.

B. Description: Wall-sleeve assembly, consisting of housing and gland, gaskets, and pipe sleeve.

1. Carrier-Pipe Deflection: Up to 5 percent without leakage.
2. Housing: Ductile-iron casting with hub, waterstop, anchor ring, and locking devices. Include gland, bolts, and nuts.
3. Housing-to-Sleeve Gasket: **EPDM rubber**.
4. Housing-to-Carrier-Pipe Gasket: AWWA C111, **EPDM rubber**.
5. Pipe Sleeve: AWWA C151, ductile-iron pipe or **ASTM A 53/A 53M, Schedule 40, zinc-coated steel pipe**.

## 2.13 GROUT

- A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Comply with requirements in Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

### 3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install underground **copper tube** in PE encasement according to ASTM A 674 or AWWA C105.
- E. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.
- F. Install shutoff valve immediately upstream of each dielectric fitting.
- G. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.
- H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- I. Install seismic restraints on piping. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.
- J. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- K. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- L. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- M. Install piping adjacent to equipment and specialties to allow service and maintenance.
- N. Install piping to permit valve servicing.
- O. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- P. Install piping free of sags and bends.
- Q. Install fittings for changes in direction and branch connections.
- R. Install PEX piping with loop at each change of direction of more than 90 degrees.

- S. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- T. Install pressure gages on suction and discharge piping from each plumbing pump and packaged booster pump. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages.
- U. Install thermostats in hot-water circulation piping. Comply with requirements in Division 22 Section "Domestic Water Pumps" for thermostats.
- V. Install thermometers on **inlet and outlet** piping from each water heater. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.

### 3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  1. Apply appropriate tape or thread compound to external pipe threads.
  2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
- G. Copper-Tubing, Push-on Joints: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.
- H. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2104. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- I. Copper-Tubing Grooved Joints: Roll groove end of tube. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for roll-grooved joints.
- J. Ductile-Iron-Piping Grooved Joints: Cut groove end of pipe. Assemble coupling with housing, gasket, lubricant, and bolts. Join ductile-iron pipe and grooved-end fittings according to AWWA C606 for ductile-iron-pipe, cut-grooved joints.

- K. Steel-Piping Grooved Joints: **Roll** groove end of pipe. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- L. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- M. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
  - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
  - 3. PVC Piping: Join according to ASTM D 2855.
- N. PEX Piping Joints: Join according to ASTM F 1807.
- O. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

### 3.4 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."
  - 1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
  - 2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.
- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.
- E. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for calibrated balancing valves.

### 3.5 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.

- B. Transition Fittings in Underground Domestic Water Piping:
  - 1. NPS 1-1/2 and Smaller: Fitting-type coupling.
  - 2. NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition **fittings or unions**.

### 3.6 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for **NPS 2** and Smaller: Use **unions**.
- C. Dielectric Fittings for **NPS 2-1/2 to NPS 4**: Use dielectric **flange kits**.
- D. Dielectric Fittings for **NPS 5** and Larger: Use dielectric flange kits.

### 3.7 FLEXIBLE CONNECTOR INSTALLATION

- A. Install flexible connectors in suction and discharge piping connections to each domestic water pump **and in suction and discharge manifold connections to each domestic water booster pump**.
- B. Install bronze-hose flexible connectors in copper domestic water tubing.
- C. Install stainless-steel-hose flexible connectors in steel domestic water piping.

### 3.8 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.
- B. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
  - 1. Vertical Piping: MSS Type 8 or 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet If Indicated: MSS Type 49, spring cushion rolls.
  - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

- E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
  - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
  - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
  - 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
  - 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
  - 6. NPS 6: 10 feet with 5/8-inch rod.
  - 7. NPS 8: 10 feet with 3/4-inch rod.
  
- F. Install supports for vertical copper tubing every 10 feet.
  
- G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
  - 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
  - 3. NPS 2: 10 feet with 3/8-inch rod.
  - 4. NPS 2-1/2: 11 feet with 1/2-inch rod.
  - 5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
  - 6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
  - 7. NPS 6: 12 feet with 3/4-inch rod.
  - 8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.
  
- H. Install supports for vertical steel piping every 15 feet.
  
- I. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.
  - 2. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.
  - 3. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
  - 4. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
  - 5. NPS 6: 48 inches with 3/4-inch rod.
  - 6. NPS 8: 48 inches with 7/8-inch rod.
  
- J. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.
  
- K. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1 and Smaller: 32 inches with 3/8-inch rod.
  
- L. Install hangers for vertical PEX piping every 48 inches.
  
- M. Install vinyl-coated hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 2 and Smaller: 48 inches with 3/8-inch rod.
  - 2. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
  - 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
  - 4. NPS 6: 48 inches with 3/4-inch rod.
  - 5. NPS 8: 48 inches with 7/8-inch rod.

- N. Install supports for vertical PVC piping every 48 inches.
- O. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

### 3.9 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
  - 1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
  - 2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
  - 3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
  - 4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

### 3.10 ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors.
- B. Escutcheons for New Piping:
  - 1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
  - 2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, **cast brass with polished chrome-plated finish.**
  - 3. Bare Piping at Ceiling Penetrations in Finished Spaces: **One piece, cast brass with polished chrome-plated finish One piece or split casting, cast brass with polished chrome-plated finish**
  - 4. Bare Piping in Unfinished Service Spaces: One piece, **cast brass with polished chrome-plated finish**
  - 5. Bare Piping in Equipment Rooms: One piece, **cast brass.**
  - 6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.
- C. Escutcheons for Existing Piping:
  - 1. Chrome-Plated Piping: Split casting, cast brass with chrome-plated finish.
  - 2. Insulated Piping: Split plate, stamped steel with **concealed exposed-rivet concealed or exposed-rivet** hinge and spring clips.
  - 3. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split **casting, cast brass with chrome-plated finish plate, stamped steel with concealed hinge and spring clips.**

4. Bare Piping at Ceiling Penetrations in Finished Spaces: Split casting, cast brass with chrome-plated finish plate, stamped steel with concealed hinge and set screw.
5. Bare Piping in Unfinished Service Spaces: Split casting, cast brass with polished chrome-plated finish casting, cast brass with rough-brass finish plate.
6. Bare Piping in Equipment Rooms: Split casting, cast brass plate, stamped steel with set screw or spring clips.
7. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting floor plate.

### 3.11 SLEEVE INSTALLATION

- A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.
- B. Sleeves are not required for core-drilled holes.
- C. Permanent sleeves are not required for holes formed by removable PE sleeves.
- D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.
- E. Install sleeves in new partitions, slabs, and walls as they are built.
- F. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.
- G. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.
- H. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using **sleeve seals wall penetration systems** specified in this Section.
- I. Seal space outside of sleeves in concrete slabs and walls with grout.
- J. Install sleeves that are large enough to provide **1/4-inch** annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.
- K. Install sleeve materials according to the following applications:
  1. Sleeves for Piping Passing through Concrete Floor Slabs: **Steel pipe**.
  2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: **Steel pipe Stack sleeve fittings**.
    - a. Extend sleeves **2 inches** above finished floor level.
    - b. For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to **2 inches** above finished floor level. Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
  3. Sleeves for Piping Passing through Gypsum-Board Partitions:
    - a. **PVC pipe Steel pipe** sleeves for pipes smaller than NPS 6.
    - b. **Galvanized-steel sheet** sleeves for pipes NPS 6 and larger.

- c. Exception: Sleeves are not required for water supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.
- 4. Sleeves for Piping Passing through Concrete Roof Slabs: **Steel pipe** .
- 5. Sleeves for Piping Passing through Exterior Concrete Walls:
  - a. **Steel pipe** sleeves for pipes smaller than NPS 6.
  - b. **Cast-iron wall pipe** sleeves for pipes NPS 6 and larger.
  - c. Install sleeves that are large enough to provide **1-inch annular** clear space between sleeve and pipe or pipe insulation when sleeve seals are used.
  - d. Do not use sleeves when wall penetration systems are used.
- 6. Sleeves for Piping Passing through Interior Concrete Walls:
  - a. **Steel pipe** sleeves for pipes smaller than NPS 6.
  - b. **Galvanized-steel sheet** sleeves for pipes NPS 6 and larger.
- L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestop materials and installations.

### 3.12 SLEEVE SEAL INSTALLATION

- A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.
- B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.13 WALL PENETRATION SYSTEM INSTALLATION

- A. Install wall penetration systems in new, exterior concrete walls.
- B. Assemble wall penetration system components with sleeve pipe. Install so that end of sleeve pipe and face of housing are flush with wall. Adjust locking devices to secure sleeve pipe in housing.

### 3.14 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.
- B. Label pressure piping with system operating pressure.

### 3.15 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
  - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
  - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
  2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
  3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
  5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
  6. Prepare reports for tests and for corrective action required.
- D. Domestic water piping will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.16 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
  - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
  - b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.

7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

### 3.17 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
  1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
  2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Fill and isolate system according to either of the following:
      - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
      - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
    - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- B. Clean non-potable domestic water piping as follows:
  1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
  2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

### 3.18 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

- D. Under-building-slab, domestic water, building service piping, **NPS 3 and smaller**, shall be **one of the following**:
  - 1. Soft copper tube, **ASTM B 88, Type K ASTM B 88, Type L; wrought-copper solder-joint fittings; and brazed copper pressure-seal fittings; and pressure-sealed joints.**
- E. Under-building-slab, domestic water, building-service piping, **NPS 4 to NPS 8 and larger**, shall be **one of the following**:
  - 1. Soft copper tube, **ASTM B 88, Type K ASTM B 88, Type L;** wrought-copper solder-joint fittings; and brazed joints.
  - 2. Mechanical-joint, ductile-iron pipe; **standard- or compact-** pattern mechanical-joint fittings; and mechanical joints.
  - 3. Push-on-joint, ductile-iron pipe; **standard- or compact-** pattern push-on-joint fittings; and gasketed joints.
  - 4. Plain-end, ductile-iron pipe; grooved-joint, ductile-iron-pipe appurtenances; and grooved joints.
- F. Under-building-slab, domestic water piping, **NPS 2 and smaller**, shall be **one of the following**:
  - 1. **Hard Hard or soft Soft** copper tube, ASTM B 88, Type L; **wrought-copper solder-joint fittings; and brazed copper pressure-seal-joint fittings; and pressure-sealed joints.**
  - 2. PVC, **Schedule 40 pipe; PVC, Schedule 40 Schedule 80 pipe; PVC, Schedule 80** socket fittings; and solvent-cemented joints.
- G. Aboveground domestic water piping, **NPS 2 and smaller**, shall be the following:
  - 1. Hard copper tube, **ASTM B 88, Type L ASTM B 88, Type M; cast- or wrought-** copper solder-joint fittings; and **soldered** joints.
- H. Aboveground domestic water piping, **NPS 2-1/2 to NPS 4**, shall be **one of the following**:
  - 1. Hard copper tube, **ASTM B 88, Type L ASTM B 88, Type M; cast- or wrought-** copper solder-joint fittings; and **brazed** joints.

### 3.19 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  - 1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
  - 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
  - 3. Hot-Water Circulation Piping, Balancing Duty: **Memory-stop** balancing valves.
  - 4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.
- C. Iron grooved-end valves may be used with grooved-end piping.

END OF SECTION 221116

## SECTION 221119

### DOMESTIC WATER PIPING SPECIALTIES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following domestic water piping specialties:

1. Vacuum breakers.
2. Backflow preventers.
3. Meters.
4. Water pressure-reducing valves.
5. Balancing valves.
6. Strainers.
7. Hose bibbs.
8. Wall hydrants.
9. Drain valves.
10. Water hammer arresters.
11. Air vents.
12. Trap-seal primer valves.

- B. Related Sections include the following:

1. Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers, pressure gages, and flow meters in domestic water piping.
2. Division 22 Section "Domestic Water Piping" for water meters.
3. Division 22 Section "Drinking Fountains and Water Coolers" for water filters for water coolers.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig , unless otherwise indicated.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

## 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. NSF Compliance:
  - 1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
  - 2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

## PART 2 - PRODUCTS

### 2.1 VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers :
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ames Co.
    - b. Cash Acme.
    - c. Conbraco Industries, Inc.
    - d. FEBCO; SPX Valves & Controls.
    - e. Rain Bird Corporation.
    - f. Toro Company (The); Irrigation Div.
    - g. Watts Industries, Inc.; Water Products Div.
    - h. Zurn Plumbing Products Group; Wilkins Div.
  - 2. Standard: ASSE 1001.
  - 3. Size: NPS 1/4 to NPS 3, as required to match connected piping.
  - 4. Body: Bronze.
  - 5. Inlet and Outlet Connections: Threaded.
  - 6. Finish: Rough bronze/Chrome plated.
- B. Pressure Vacuum Breakers :
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ames Co.
    - b. Conbraco Industries, Inc.
    - c. FEBCO; SPX Valves & Controls.
    - d. Flomatic Corporation.
    - e. Toro Company (The); Irrigation Div.
    - f. Watts Industries, Inc.; Water Products Div.
    - g. Zurn Plumbing Products Group; Wilkins Div.
  - 2. Standard: ASSE 1020.
  - 3. Operation: Continuous-pressure applications.

4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
5. Size: As required
6. Design Flow Rate:
7. Selected Unit Flow Range Limits:
8. Pressure Loss at Design Flow Rate:
9. Accessories:

- a. Valves: Ball type, on inlet and outlet.

## 2.2 BACKFLOW PREVENTERS

### A. Intermediate Atmospheric-Vent Backflow Preventers :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Cash Acme.
  - b. Conbraco Industries, Inc.
  - c. FEBCO; SPX Valves & Controls.
  - d. Honeywell Water Controls.
  - e. Legend Valve.
  - f. Watts Industries, Inc.; Water Products Div.
  - g. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1012.
3. Operation: Continuous-pressure applications.
4. Size: NPS 1/2 NPS 3/4.
5. Body: Bronze.
6. End Connections: Union, solder Solder joint.
7. Finish: Chrome plated Rough bronze.

### B. Double-Check, Detector-Assembly Backflow Preventers :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Ames Co.
  - b. Conbraco Industries, Inc.
  - c. FEBCO; SPX Valves & Controls.
  - d. Watts Industries, Inc.; Water Products Div.
  - e. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1048 and FMG approved or UL listed.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
5. Size: As required
6. Design Flow Rate:
7. Selected Unit Flow Range Limits:
8. Pressure Loss at Design Flow Rate:
9. Body: Cast iron with interior lining complying with AWWA C550 or that is FDA approved Steel with interior lining complying with AWWA C550 or that is FDA approved Stainless steel.
10. End Connections: Flanged.

11. Configuration: Designed for horizontal, straight through vertical inlet, horizontal center section, and vertical outlet vertical flow.
12. Accessories:
  - a. Valves: Outside screw and yoke gate-type with flanged ends on inlet and outlet.
  - b. Bypass: With displacement-type water meter, shutoff valves, and reduced-pressure backflow preventer.

## 2.3 WATER METERS

- A. Water meters will be furnished by Plumbing Contractor & meet the requirements of the NYC DEP.
- B. Manufacturers:
  1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. AMCO Water Metering Systems.
    - b. Badger Meter, Inc.
    - c. Mueller Co.; Hersey Meters.
    - d. Neptune Technology Group Inc.
    - e. Sensus Metering Systems.
- C. Turbine-Type Water Meters:
  1. Description:
    - a. Standard: AWWA C701.
    - b. Registration: Flow in gallons cubic feet.
- D. Compound-Type Water Meters:
  1. Description:
    - a. Standard: AWWA C702.
    - b. Registration: Flow in gallons cubic feet.
- E. Remote Registration System:
  1. Description: Utility company standard; encoder type. Include meter modified with signal-transmitting assembly, low-voltage connecting wiring, and remote register assembly.
    - a. Standard: AWWA C707.
    - b. Registration: Flow in gallons cubic feet.
    - c. Data-Acquisition Units: Comply with utility company requirements for type and quantity.
    - d. Visible Display Units: Comply with utility company requirements for type and quantity.
- F. Backflow-Preventer Test Kits :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Conbraco Industries, Inc.
  - b. FEBCO; SPX Valves & Controls.
  - c. Flomatic Corporation.
  - d. Watts Industries, Inc.; Water Products Div.
  - e. Zurn Plumbing Products Group; Wilkins Div.
2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

G. Water Control Valves :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. CLA-VAL Automatic Control Valves.
  - b. Flomatic Corporation.
  - c. OCV Control Valves.
  - d. Watts Industries, Inc.; Ames Fluid Control Systems.
  - e. Watts Industries, Inc.; Watts ACV.
  - f. Zurn Plumbing Products Group; Wilkins Div.
2. Description: Pilot-operation, diaphragm-type, single-seated main water control valve.
3. Pressure Rating: Initial working pressure of 150 psig minimum with AWWA C550 or FDA-approved, interior epoxy coating. Include small pilot-control valve, restrictor device, specialty fittings, and sensor piping.
4. Main Valve Body: Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.
  - a. Size: As required
  - b. Pattern: Angle/Globe-valve design.
  - c. Trim: Stainless steel.
5. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.

2.4 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Armstrong International, Inc.
  - b. Flo Fab Inc.
  - c. ITT Industries; Bell & Gossett Div.
  - d. NIBCO INC.
  - e. TAC Americas.
  - f. Taco, Inc.
  - g. Watts Industries, Inc.; Water Products Div.

2. Type: Ball or Y-pattern globe valve with two readout ports and memory setting indicator.
3. Body: Brass or bronze,
4. Size: Same as connected piping, but not larger than NPS 2.
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

B. Cast-Iron Calibrated Balancing Valves :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide a product by one of the following:
  - a. Armstrong International, Inc.
  - b. Flo Fab Inc.
  - c. ITT Industries; Bell & Gossett Div.
  - d. NIBCO INC.
  - e. TAC Americas.
  - f. Watts Industries, Inc.; Water Products Div.
4. Type: Adjustable with Y-pattern globe valve, two readout ports, and memory-setting indicator.
5. Size: Same as connected piping, but not smaller than NPS 2-1/2.

C. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

D. Memory-Stop Balancing Valves :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Conbraco Industries, Inc.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Crane Co.; Crane Valve Group; Jenkins Valves.
  - d. Crane Co.; Crane Valve Group; Stockham Div.
  - e. Hammond Valve.
  - f. Milwaukee Valve Company.
  - g. NIBCO INC.
  - h. Red-White Valve Corp.
2. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
3. Pressure Rating: 400-psig minimum CWP.
4. Size: NPS 2 or smaller.
5. Body: Copper alloy.
6. Port: Standard or full port.
7. Ball: Chrome-plated brass.
8. Seats and Seals: Replaceable.
9. End Connections: Solder joint or threaded.
10. Handle: Vinyl-covered steel with memory-setting device.

## 2.5 STRAINERS FOR DOMESTIC WATER PIPING

### A. Y-Pattern Strainers :

1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Perforation Size:
  - a. Strainers NPS 2 and Smaller: 0.020 inch 0.033 inch 0.062 inch .
  - b. Strainers NPS 2-1/2 to NPS 4: 0.045 inch 0.062 inch 0.125 inch .
  - c. Strainers NPS 5 and Larger: 0.10 inch 0.125 inch 0.25 inch .
6. Drain: Pipe plug Factory-installed/hose-end drain valve.

### B. Hose Bibbs :

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze, Chrome or nickel plated.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle.
12. Operation for Service Areas: Wheel handle.
13. Include integral wall flange with each chrome- or nickel-plated hose bibb.

## 2.6 WALL HYDRANTS

### A. Vacuum Breaker Nonfreeze Wall Hydrants:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Arrowhead Brass Products, Inc.
  - b. Mansfield Plumbing Products LLC.
  - c. McDonald, A. Y. Mfg. Co.
  - d. Prier Products, Inc.
  - e. Smith, Jay. R. Mfg. Co.; Division of Smith Industries, Inc.
  - f. Watts Industries, Inc.; Water Products Div.
  - g. Woodford Manufacturing Company.
  - h. Zurn Plumbing Products Group; Light Commercial Operation.
2. Standard: ASSE 1019, Type A or Type B.
3. Type: Freeze-resistant, automatic draining with integral air-inlet valve.
4. Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.

5. Pressure Rating: 125 psig.
6. Operation: Loose key Loose key.
7. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
8. Inlet: NPS 1/2 or NPS 3/4.
9. Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.

## 2.7 DRAIN VALVES

### A. Ball-Valve-Type, Hose-End Drain Valves :

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

### B. Gate-Valve-Type, Hose-End Drain Valves :

1. Standard: MSS SP-80 for gate valves.
2. Pressure Rating: Class 125.
3. Size: NPS 3/4.
4. Body: ASTM B 62 bronze.
5. Inlet: NPS 3/4 threaded or solder joint.
6. Outlet: Garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

### C. Stop-and-Waste Drain Valves :

1. Standard: MSS SP-110 for ball valves or MSS SP-80 for gate valves.
2. Pressure Rating: 200-psig minimum CWP or Class 125.
3. Size: NPS 3/4.
4. Body: Copper alloy or ASTM B 62 bronze.
5. Drain: NPS 1/8 side outlet with cap.

## 2.8 WATER HAMMER ARRESTERS

### A. Water Hammer Arresters :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. AMTROL, Inc.
  - b. Josam Company.
  - c. MIFAB, Inc.
  - d. PPP Inc.
  - e. Sioux Chief Manufacturing Company, Inc.
  - f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - g. Tyler Pipe; Wade Div.
  - h. Watts Drainage Products Inc.

- i. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Neoprene Bellows.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

## 2.9 AIR VENTS

### A. Bolted-Construction Automatic Air Vents :

1. Body: Bronze.
2. Pressure Rating: 125-psig minimum pressure rating at 140 deg F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 NPS 1/2 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

### B. Welded-Construction Automatic Air Vents :

1. Body: Stainless steel.
2. Pressure Rating: 150-psig minimum pressure rating.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

## 2.10 TRAP-SEAL PRIMER VALVES

### A. Supply-Type, Trap-Seal Primer Valves :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. MIFAB, Inc.
  - b. PPP Inc.
  - c. Sioux Chief Manufacturing Company, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Watts Industries, Inc.; Water Products Div.
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

### B. Drainage-Type, Trap-Seal Primer Valves :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
- 3. Standard: ASSE 1044, lavatory P-trap with NPS 3/8 minimum, trap makeup connection.
- 4. Size: NPS 1-1/4 minimum.
- 5. Material: Chrome-plated, cast brass.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
  - 1. Locate backflow preventers in same room as connected equipment or system.
  - 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
  - 3. Do not install bypass piping around backflow preventers.
- C. Install water regulators with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gages on inlet and outlet.
- D. Install water control valves with inlet and outlet shutoff valves and bypass with globe valve. Install pressure gages on inlet and outlet.
- E. Install balancing valves in locations where they can easily be adjusted.
- F. Install Y-pattern strainers for water on supply side of each incoming domestic & fire service, solenoid valve and pump.
- G. Install outlet boxes recessed in wall. Install 2-by-4-inch fire-retardant-treated-wood blocking wall reinforcement between studs. Fire-retardant-treated-wood blocking is specified in Division 06 Section "Rough Carpentry."
- H. Install nonfreeze-type exterior wall hydrants.
- I. Install water hammer arresters in water piping according to PDI-WH 201.
- J. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.
- K. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- L. Install drainage-type, trap-seal primer valves as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.
- M. Install trap-seal primer systems with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust system for proper flow.

### 3.2 WATER METER INSTALLATION

- A. Rough-in domestic water piping for water meter installation, and install water meters according to utility company's requirements.
- B. Water meters will be furnished and installed by utility company.
- C. Install water meters according to AWWA M6, utility company's requirements, and the following:
- D. Install displacement-type water meters with shutoff valve on water-meter inlet. Install valve on water-meter outlet and valved bypass around meter unless prohibited by authorities having jurisdiction.
- E. Install turbine-type water meters with shutoff valve on water-meter inlet. Install valve on water-meter outlet and valved bypass around meter unless prohibited by authorities having jurisdiction.
- F. Install compound-type water meters with shutoff valves on water-meter inlet and outlet and on valved bypass around meter. Support meters, valves, and piping on brick or concrete piers.
- G. Install fire-service water meters with shutoff valves on water-meter inlet and outlet and on full-size valved bypass around meter. Support meter, valves, and piping on brick or concrete piers.
- H. Install remote registration system according to standards of utility company and of authorities having jurisdiction.

### 3.3 DETECTOR CHECK VALVE INSTALLATION

- A. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- B. Support detector check valves and piping on concrete piers. Comply with requirements for concrete piers in Division 03 Section "Cast-in-Place Concrete and/or Miscellaneous Cast-in-Place Concrete."

### 3.4 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.
- B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.5 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
  - 1. Pressure vacuum breakers.
  - 2. Intermediate atmospheric-vent backflow preventers.
  - 3. Backflow-prevention assemblies.
  - 4. Double-check, detector-assembly backflow preventers.

5. Calibrated balancing valves.
6. Primary water tempering valves.
7. Hose stations.
8. Supply-type, trap-seal primer valves.
9. Trap-seal primer systems.

- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

### 3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:

1. Test each pressure vacuum breaker, and double-check detector-assembly backflow preventer according to authorities having jurisdiction and the device's reference standard.

- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

### 3.7 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

END OF SECTION 221119

## SECTION 221316

### SANITARY WASTE STORM AND VENT PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following for soil, waste, storm and vent piping inside the building:
  - 1. Pipe, tube, and fittings.
  - 2. Special pipe fittings.
  - 3. Encasement for underground metal piping.

##### 1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. LLDPE: Linear, low-density polyethylene plastic.
- D. NBR: Acrylonitrile-butadiene rubber.
- E. PE: Polyethylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. TPE: Thermoplastic elastomer.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
  - 1. Soil, Waste, and Vent Piping: 10-foot head of water
  - 2. Sanitary Sewer, Force-Main Piping: 50 psig 100 psig 150 psig
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be capable of withstanding the effects of seismic events determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures."

##### 1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. LEED Submittal:

1. Product Data for Credit EQ 4.1: For solvent cements and adhesive primers, including printed statement of VOC content.
- C. Shop Drawings:
1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.
- D. Field quality-control inspection and test reports.
- 1.6 QUALITY ASSURANCE
- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
  - B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

### 2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service and Extra-Heavy class(es).
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

### 2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.
- C. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.

1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
  - a. Available Manufacturers:
    - 1) ANACO.
    - 2) Fernco, Inc.
    - 3) Ideal Div.; Stant Corp.
    - 4) Mission Rubber Co.
    - 5) Tyler Pipe; Soil Pipe Div.
  
2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
  - a. Available Manufacturers:
    - 1) ANACO.
    - 2) Clamp-All Corp.
    - 3) Ideal Div.; Stant Corp.
    - 4) Mission Rubber Co.
    - 5) Tyler Pipe; Soil Pipe Div.
  
3. Heavy-Duty, Shielded, Cast-Iron Couplings: ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve.
  - a. Available Manufacturers:
    - 1) MG Piping Products Co.
  
- D. Rigid, Unshielded Couplings: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion-resistant-metal tension band and tightening mechanism on each end.
  1. Available Manufacturers:
    - a. ANACO.

## 2.5 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Standard Weight or Schedule 40, galvanized. Include ends matching joining method.
- B. Drainage Fittings: ASME B16.12, galvanized, threaded, cast-iron drainage pattern.
- C. Pressure Fittings:
  1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
  2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.
  3. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
  4. Cast-Iron Flanges: ASME B16.1, Class 125.
  5. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized.

D. Grooved-Joint Systems:

1. Available Manufacturers:

- a. Anvil International.
- b. Star Pipe Products; Star Fittings Div.
- c. Victaulic Company.
- d. Ward Manufacturing, Inc.

2. Grooved-End, Steel-Piping Fittings: ASTM A 47/A 47M, galvanized, malleable-iron casting; ASTM A 106, galvanized-steel pipe; or ASTM A 536, galvanized, ductile-iron casting; with dimensions matching steel pipe.

3. Grooved-End, Steel-Piping Couplings: AWWA C606, for steel-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.6 STAINLESS-STEEL PIPE AND FITTINGS

A. Pipe and Fittings: ASME A112.3.1, drainage pattern with socket and spigot ends.

B. Gaskets: Lip seals shaped to fit socket groove, with plastic backup ring.

1. Material: EPDM, unless NBR is indicated.

2.7 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end, unless grooved or flanged ends are indicated.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end, unless grooved or flanged ends are indicated.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. Gaskets: AWWA C111, rubber.

C. Grooved-Joint Systems:

1. Available Manufacturers:

- a. Victaulic Company.

2. Grooved-End, Ductile-Iron Fittings: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.

3. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

D. Flanges: ASME 16.1, Class 125, cast iron.

## 2.8 COPPER TUBE AND FITTINGS

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
  - 1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- B. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.
  - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
  - 2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
  - 3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- C. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.
  - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

## 2.9 ABS PIPE AND FITTINGS

- A. Solid-Wall ABS Pipe: ASTM D 2661, Schedule 40.
- B. Cellular-Core ABS Pipe: ASTM F 628, Schedule 40.
- C. ABS Socket Fittings: ASTM D 2661, made to ASTM D 3311, drain, waste, and vent patterns.
- D. Solvent Cement and Adhesive Primer:
  - 1. Use ABS solvent cement that has a VOC content of 325 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.10 SPECIAL PIPE FITTINGS

- A. Flexible, Nonpressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
  - 1. Available Manufacturers:
    - a. Dallas Specialty & Mfg. Co.
    - b. Fernco, Inc.
    - c. Logan Clay Products Company (The).
    - d. Mission Rubber Co.
    - e. NDS, Inc.
    - f. Plastic Oddities, Inc.
  - 2. Sleeve Materials:
    - a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
    - b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

- c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- B. Shielded Nonpressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
  - 1. Available Manufacturers:
    - a. Cascade Waterworks Mfg. Co.
    - b. Mission Rubber Co.
- C. Rigid, Unshielded, Nonpressure Pipe Couplings: ASTM C 1461, sleeve-type reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion-resistant-metal tension band and tightening mechanism on each end.
  - 1. Available Manufacturers:
    - a. ANACO.
- D. Pressure Pipe Couplings: AWWA C219 metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
  - 1. Available Manufacturers:
    - a. Cascade Waterworks Mfg. Co.
    - b. Dresser, Inc.; DMD Div.
    - c. EBAA Iron Sales, Inc.
    - d. Ford Meter Box Company, Inc. (The); Pipe Products Div.
    - e. JCM Industries, Inc.
    - f. Romac Industries, Inc.
    - g. Smith-Blair, Inc.
    - h. Viking Johnson.
  - 2. Center-Sleeve Material: Manufacturer's standard Carbon steel Stainless steel Ductile iron Malleable iron.
  - 3. Gasket Material: Natural or synthetic rubber.
  - 4. Metal Component Finish: Corrosion-resistant coating or material.
- E. Flexible Ball Joints: Ductile-iron fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include gasketed ball-joint section and ductile-iron gland, rubber gasket, and steel bolts.
  - 1. Available Manufacturers:
    - a. EBAA Iron Sales, Inc.
- F. Expansion Joints: Two or three-piece, ductile-iron assembly consisting of telescoping sleeve(s) with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
  - 1. Available Manufacturers:
    - a. EBAA Iron Sales, Inc.

- b. Romac Industries, Inc.
  - c. Star Pipe Products; Star Fittings Div.
- G. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
- 1. Available Manufacturers:
    - a. SIGMA Corp.

## 2.11 ENCASUREMENT FOR UNDERGROUND METAL PIPING

- A. Description: ASTM A 674 or AWWA C105, high-density, crosslaminated PE film of 0.004-inch or LLDPE film of 0.008-inch minimum thickness.
- B. Form: Sheet or tube.
- C. Color: Black or natural.

## PART 3 - EXECUTION

### 3.1 EXCAVATION

- A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

### 3.2 PIPING APPLICATIONS

- A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:
  - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  - 2. Hubless cast-iron soil pipe and fittings and solvent stack fittings; standard, shielded, stainless-steel heavy-duty shielded, stainless-steel and rigid, unshielded couplings; and hubless-coupling joints.
  - 3. Steel pipe, drainage fittings, and threaded joints.
  - 4. Stainless-steel pipe and fittings, gaskets, and gasketed joints.
  - 5. Copper DWV tube, copper drainage fittings, and soldered joints.
  - 6. Solid-wall Cellular-core ABS pipe, ABS socket fittings, and solvent-cemented joints.
  - 7. Solid-wall Cellular-core PVC pipe, PVC socket fittings, and solvent-cemented joints.
  - 8. Dissimilar Pipe-Material Couplings: Flexible, Shielded, Rigid, unshielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- C. Aboveground, soil and waste piping NPS 5 and larger shall be any of the following:
  - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  - 2. Hubless cast-iron soil pipe and fittings and solvent stack fittings; standard, and heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
  - 3. Steel pipe, drainage fittings, and threaded joints.
  - 4. Solid-wall Cellular-core PVC pipe, PVC socket fittings, and solvent-cemented joints.
  - 5. Dissimilar Pipe-Material Couplings: Flexible, Shielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

- D. Aboveground, vent piping NPS 4 and smaller shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel heavy-duty shielded, stainless-steel and rigid, unshielded couplings; and hubless-coupling joints.
  3. Steel pipe, drainage fittings, and threaded joints.
  4. Stainless-steel pipe and fittings gaskets, and gasketed joints.
  5. Copper DWV tube, copper drainage fittings, and soldered joints.
    - a. Option for Vent Piping, NPS 2-1/2 and NPS 3-1/2: Hard copper tube, Type M; copper pressure fittings; and soldered joints.
  6. Solid-wall Cellular-core ABS pipe, ABS socket fittings, and solvent-cemented joints.
  7. Solid-wall Cellular-core PVC pipe, PVC socket fittings, and solvent-cemented joints.
  8. Dissimilar Pipe-Material Couplings: Flexible, Shielded, Rigid, unshielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- E. Aboveground, vent piping NPS 5 and larger shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  2. Hubless cast-iron soil pipe and fittings; standard, and heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
  3. Steel pipe, drainage fittings, and threaded joints.
  4. Solid-wall Cellular-core PVC pipe, PVC socket fittings, and solvent-cemented joints.
  5. Dissimilar Pipe-Material Couplings: Flexible, Shielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
1. Extra-Heavy Service class, cast-iron soil piping; gaskets; and gasketed calking materials; and calked joints.
  2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel heavy-duty shielded, stainless-steel heavy-duty shielded, cast-iron and rigid, unshielded couplings; and hubless-coupling joints.
  3. Stainless-steel pipe and fittings, gaskets, and gasketed joints.
  4. Cellular-core Solid wall ABS pipe, ABS socket fittings, and solvent-cemented joints.
  5. Cellular-core Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
  6. Cellular-core, Sewer and Drain Series, PVC pipe; PVC socket fittings; and solvent-cemented joints.
  7. Dissimilar Pipe-Material Couplings: Flexible, Shielded, Rigid, unshielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- G. Underground, soil and waste piping NPS 5 and larger shall be any of the following:
1. Extra-Heavy Service class, cast-iron soil piping; gaskets; and gasketed calking materials; and calked joints.
  2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel heavy-duty shielded, stainless-steel and heavy-duty shielded, cast-iron couplings; and hubless-coupling joints.
  3. Cellular-core Solid-wall, Schedule 40, PVC pipe; PVC socket fittings; and solvent-cemented joints.
  4. Cellular-core, Sewer and Drain Series, PVC pipe; PVC socket fittings; and solvent-cemented joints.
  5. Dissimilar Pipe-Material Couplings: Flexible, Shielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

- H. Aboveground sanitary-sewage force mains NPS 1-1/2 and NPS 2 shall be any of the following:
  - 1. Hard copper tube, Type L Type M; copper pressure fittings; and soldered joints.
  - 2. Steel pipe, pressure fittings, and threaded joints.
- I. Aboveground sanitary-sewage force mains NPS 2-1/2 to NPS 6 shall be any of the following:
  - 1. Hard copper tube, Type L Type M; copper pressure fittings; and soldered joints.
  - 2. Steel pipe, pressure fittings, and threaded joints.
  - 3. Grooved-end steel pipe, grooved-joint system fittings and couplings, and grooved joints.
- J. Underground sanitary-sewage force mains NPS 4 and smaller shall be any of the following:
  - 1. Hard Soft copper tube, Type L; wrought-copper pressure fittings; and soldered joints.
  - 2. Steel pipe, pressure fittings, and threaded joints.
    - a. Include grooved-joint system fittings and couplings and grooved joints where indicated.
  - 3. Mechanical-joint, ductile-iron pipe; mechanical-joint, ductile-iron fittings; glands, gaskets, and bolts; and mechanical joints.
    - a. Include grooved-joint system fittings and couplings and grooved joints where indicated.
  - 4. Push-on-joint, ductile-iron pipe; push-on-joint ductile-iron fittings; gaskets; and gasketed joints.
    - a. Include grooved-joint system fittings and couplings and grooved joints where indicated.
  - 5. Pressure pipe couplings, if dissimilar pipe materials or piping with small difference in OD must be joined.
- K. Underground sanitary-sewage force mains NPS 5 and larger shall be any of the following:
  - 1. Steel pipe, pressure fittings, and threaded joints.
  - 2. Mechanical-joint, ductile-iron pipe; mechanical-joint, ductile-iron fittings; glands, gaskets, and bolts; and mechanical-joint joints.
  - 3. Push-on-joint, ductile-iron pipe; push-on-joint, ductile-iron fittings; gaskets; and gasketed joints.
  - 4. Pressure pipe couplings, if dissimilar pipe materials or piping with small difference in OD must be joined.

### 3.3 PIPING INSTALLATION

- A. Sanitary sewer piping outside the building is specified in Division 22 Section "Facility Sanitary Sewers."
- B. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- C. Install seismic restraints on piping. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."

- D. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- E. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.
- F. Install underground, steel, force-main piping. Install encasement on piping according to ASTM A 674 or AWWA C105.
- G. Install underground, ductile-iron, force-main piping according to AWWA C600. Install buried piping inside the building between wall and floor penetrations and connection to sanitary sewer piping outside the building with restrained joints. Anchor pipe to wall or floor. Install thrust-block supports at vertical and horizontal offsets.
  - 1. Install encasement on piping according to ASTM A 674 or AWWA C105.
- H. Install underground, copper, force-main tubing according to CDA's "Copper Tube Handbook."
  - 1. Install encasement on piping according to ASTM A 674 or AWWA C105.
- I. Install underground, ductile-iron, special pipe fittings according to AWWA C600.
  - 1. Install encasement on piping according to ASTM A 674 or AWWA C105.
- J. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."
- K. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.
- L. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
  - 1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.
- M. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- N. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- O. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

P. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
2. Sovent Drainage System: Comply with ASSE 1043 and sovent fitting manufacturer's written installation instructions.
3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.

Q. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

R. Install ABS soil and waste drainage and vent piping according to ASTM D 2661.

S. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

T. Install underground ABS and PVC soil and waste drainage piping according to ASTM D 2321.

U. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

### 3.4 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

D. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

E. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

F. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

G. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

### 3.5 VALVE INSTALLATION

A. General valve installation requirements are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

B. Shutoff Valves: Install shutoff valve on each sewage pump discharge.

1. Install gate or full-port ball valve for piping NPS 2 and smaller.
2. Install gate valve for piping NPS 2-1/2 and larger.

- C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.
- D. Backwater Valves: Install backwater valves in piping subject to sewage backflow.
  - 1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
  - 2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
  - 3. Install backwater valves in accessible locations.
  - 4. Backwater valve are specified in Division 22 Section "Sanitary Waste Piping Specialties."

### 3.6 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
  - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
  - 2. Install individual, straight, horizontal piping runs according to the following:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
  - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
  - 2. NPS 3: 60 inches with 1/2-inch rod.
  - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
  - 4. NPS 6: 60 inches with 3/4-inch rod.
  - 5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.
- G. Install supports for vertical cast-iron soil piping every 15 feet.
- H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/4: 84 inches with 3/8-inch rod.
  - 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
  - 3. NPS 2: 10 feet with 3/8-inch rod.
  - 4. NPS 2-1/2: 11 feet with 1/2-inch rod.

5. NPS 3: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
7. NPS 6: 12 feet with 3/4-inch rod.
8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.

I. Install supports for vertical steel piping every 15 feet.

J. Install hangers for stainless-steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 2: 84 inches with 3/8-inch rod.
2. NPS 3: 96 inches with 1/2-inch rod.
3. NPS 4: 108 inches with 1/2-inch rod.
4. NPS 6: 10 feet with 5/8-inch rod.

K. Install supports for vertical stainless-steel piping every 10 feet.

L. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
3. NPS 2-1/2: 108 inches with 1/2-inch rod.
4. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
5. NPS 6: 10 feet with 5/8-inch rod.
6. NPS 8: 10 feet with 3/4-inch rod.

M. Install supports for vertical copper tubing every 10 feet.

N. Install hangers for ABS and PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and 5: 48 inches with 5/8-inch rod.
4. NPS 6: 48 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 48 inches with 7/8-inch rod.

O. Install supports for vertical ABS and PVC piping every 48 inches.

P. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

### 3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.

2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Connect force-main piping to the following:

1. Sanitary Sewer: To exterior force main or sanitary manhole.
2. Sewage Pumps: To sewage pump discharge.

### 3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
4. Prepare reports for tests and required corrective action.

### 3.9 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

### 3.10 PROTECTION

- A. Exposed ABS and PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

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## SECTION 221319

### SANITARY WASTE PIPING SPECIALTIES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following sanitary drainage piping specialties:

1. Backwater valves.
2. Cleanouts.
3. Floor drains.
4. Trench drains.
5. Roof flashing assemblies.
6. Through-penetration firestop assemblies.
7. Miscellaneous sanitary drainage piping specialties.
8. Flashing materials.

##### 1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FOG: Fats, oils, and greases.
- C. FRP: Fiberglass-reinforced plastic.
- D. HDPE: High-density polyethylene plastic.
- E. PE: Polyethylene plastic.
- F. PP: Polypropylene plastic.
- G. PVC: Polyvinyl chloride plastic.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities and accessories for the following:

1. Backwater valves.
2. Cleanouts.
3. Floor drains.
4. Trench drains.

- B. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.

1. Wiring Diagrams: Power, signal, and control wiring.

- C. **Manufacturer Seismic Qualification Certification:** Submit certification that FOG disposal systems, grease interceptors, grease removal devices, oil interceptors, accessories, and components will withstand seismic forces defined in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment." Include the following:
  - 1. **Basis for Certification:** Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
  - 2. **Dimensioned Outline Drawings of Equipment Unit:** Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. **Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.**
- D. **Field quality-control test reports.**
- E. **Operation and Maintenance Data:** For drainage piping specialties to include in emergency, operation, and maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. **Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.**
- B. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. **Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.**

#### 1.6 COORDINATION

- A. **Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.**
- B. **Coordinate size and location of roof penetrations.**

#### 1.7 EXTRA MATERIALS

- A. **Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.**
  - 1. **Cultures:** Provide 1-gal. bottles of bacteria culture recommended by manufacturer of FOG disposal systems equal to 200 percent of amount installed, but no fewer than 2 1-gal. bottles.

## PART 2 - PRODUCTS

### 2.1 BACKWATER VALVES

#### A. Horizontal, Cast-Iron Backwater Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Josam Company; Josam Div.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfr. Co.; Division of Smith Industries, Inc.
  - d. Tyler Pipe; Wade Div.
  - e. Watts Drainage Products Inc.
  - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.14.1.
3. Size: Same as connected piping.
4. Body: Cast iron.
5. Cover: Cast iron with bolted or threaded access check valve.
6. End Connections: Hub and spigot Hub and spigot or hubless Hubless.
7. Type Check Valve: Removable, bronze, swing check, factory assembled or field modified to hang closed open for airflow unless subject to backflow condition.
8. Extension: ASTM A 74, Service class; full-size, cast-iron, soil-pipe extension to field-installed cleanout at floor; replaces backwater valve cover.

#### B. Drain-Outlet Backwater Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company; Josam Div.
  - b. Smith, Jay R. Mfr. Co.; Division of Smith Industries, Inc.
  - c. Watts Drainage Products Inc.
  - d. Zurn Plumbing Products Group; Specification Drainage Operation.
3. Size: Same as floor drain outlet.
4. Body: Cast iron or bronze made for vertical installation in bottom outlet of floor drain.
5. Check Valve: Removable ball float.
6. Inlet: Threaded.
7. Outlet: Threaded or spigot.

#### C. Horizontal, Plastic Backwater Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Canplas LLC.

- b. IPS Corporation.
  - c. NDS Inc.
  - d. Oatey.
  - e. Plastic Oddities; a division of Diverse Corporate Technologies.
  - f. Sioux Chief Manufacturing Company, Inc.
  - g. Zurn Plumbing Products Group; Light Commercial Operation.
- 3. Size: Same as connected piping.
  - 4. Body: ABS PVC.
  - 5. Cover: Same material as body with threaded access to check valve.
  - 6. Check Valve: Removable swing check.
  - 7. End Connections: Socket type.

## 2.2 CLEANOUTS

### A. Exposed Metal Cleanouts:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Josam Company; Josam Div.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - d. Tyler Pipe; Wade Div.
  - e. Watts Drainage Products Inc.
  - f. Zurn Plumbing Products Group; Specification Drainage Operation.
- 2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
- 3. Size: Same as connected drainage piping
- 4. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch Hubless, cast-iron soil pipe test tee Stainless-steel tee with side cleanout as required to match connected piping.
- 5. Closure: Countersunk Countersunk or raised-head Raised-head, brass cast-iron plastic plug.
- 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

### B. Metal Floor Cleanouts:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Josam Company; Josam Div.
  - b. Oatey.
  - c. Sioux Chief Manufacturing Company, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Tyler Pipe; Wade Div.
  - f. Watts Drainage Products Inc.
  - g. Zurn Plumbing Products Group; Light Commercial Operation.
  - h. Zurn Plumbing Products Group; Specification Drainage Operation.
- 2. Standard: ASME A112.36.2M for adjustable housing cast-iron soil pipe with cast-iron ferrule heavy-duty, adjustable housing threaded, adjustable housing cleanout.
- 3. Size: Same as connected branch.

4. Type: Adjustable housing Cast-iron soil pipe with cast-iron ferrule Heavy-duty, adjustable housing Threaded, adjustable housing.
5. Body or Ferrule: Cast iron Stainless steel.
6. Clamping Device: Not required Required.
7. Outlet Connection: Inside calk Spigot Threaded.
8. Closure: Brass plug with straight threads and gasket Brass plug with tapered threads Cast-iron plug Plastic plug.
9. Adjustable Housing Material: Cast iron Plastic with threads set-screws or other device.
10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy Painted cast iron Polished bronze Rough bronze Stainless steel.
11. Frame and Cover Shape: Round Square.
12. Top Loading Classification: Extra Heavy Heavy Light Medium Duty.
13. Riser: ASTM A 74, Extra-Heavy Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Josam Company; Josam Div.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - d. Tyler Pipe; Wade Div.
  - e. Watts Drainage Products Inc.
  - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hub-and-spigot, cast-iron soil pipe T-branch Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk Countersunk or raised-head Raised-head, drilled-and-threaded brass cast-iron plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, deep, chrome-plated bronze flat, chrome-plated brass or stainless-steel cover plate with screw.
8. Wall Access: Round Square, nickel-bronze, copper-alloy, or stainless-steel <Insert material> wall-installation frame and cover.

2.3 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Commercial Enameling Co.
  - b. Josam Company; Josam Div.
  - c. MIFAB, Inc.
  - d. Prier Products, Inc.
  - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - f. Tyler Pipe; Wade Div.
  - g. Watts Drainage Products Inc.
  - h. Zurn Plumbing Products Group; Light Commercial Operation.

i. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.6.3 with backwater valve.
3. Pattern: Area Floor Funnel floor Sanitary drain.
4. Body Material: Gray iron.
5. Seepage Flange: Not required Required.
6. Anchor Flange: Not required Required.
7. Clamping Device: Not required Required.
8. Outlet: Bottom Side.
9. Backwater Valve: Drain-outlet type Integral, ASME A112.14.1, swing-check type Not required.
10. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel Not required.
11. Sediment Bucket: Not required.
12. Top or Strainer Material: Bronze Gray iron Nickel bronze Stainless steel
13. Top of Body and Strainer Finish: Nickel bronze Polished bronze Rough bronze Stainless steel.
14. Top Shape: Round Square
15. Dimensions of Top or Strainer:
16. Top Loading Classification: Extra Heavy-Duty Heavy Duty Light Duty Medium Duty.
17. Funnel: Not required Required.
18. Inlet Fitting: Not required Gray iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
19. Trap Material: Bronze Cast iron Copper Not required
20. Trap Pattern: Deep-seal P-trap Standard P-trap Not required
21. Trap Features: Cleanout Trap-seal primer valve drain connection Cleanout and trap-seal primer valve drain connection Not required.

B. Stainless-Steel Floor Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Josam Company; Blucher-Josam Div.
  - b. Josam Company; Josam Div.
  - c. Kusel Equipment Co.
  - d. Scherping Systems, Inc.
  - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - f. Tyler Pipe; Wade Div.
  - g. Watts Drainage Products Inc.
  - h. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.3.1 ASME A112.6.3.
3. Outlet: Bottom Side .
4. Top or Strainer Material: Stainless steel
5. Top Shape: Round Square
6. Dimensions of Top or Strainer:
7. Seepage Flange: Not required Required.
8. Anchor Flange: Not required Required.
9. Clamping Device: Not required Required.
10. Trap-Primer Connection: Not required Required.
11. Trap Material: Cast iron Stainless steel Not required
12. Trap Pattern: Deep-seal P-trap Standard P-trap Not required

C. Plastic Floor Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Canplas LLC.
  - b. IPS Corporation.
  - c. Josam Company; Josam Div.
  - d. Oatey.
  - e. Plastic Oddities; a division of Diverse Corporate Technologies.
  - f. Sioux Chief Manufacturing Company, Inc.
  - g. Zurn Plumbing Products Group; Light Commercial Operation.
2. Standard: ASME A112.6.3.
3. Material: ABS or PVC
4. Seepage Flange: Not required Required.
5. Clamping Device: Not required Required.
6. Outlet: Bottom Side.
7. Sediment Bucket: Not required.
8. Top or Strainer Material: Bronze Plastic Stainless steel.
9. Top of Body and Strainer Finish: Nickel bronze Polished bronze Rough bronze Stainless steel.
10. Top Shape: Round Square
11. Dimensions of Top or Strainer:
12. Trap Material: Cast iron Plastic drainage piping Not required
13. Trap Pattern: Standard P-trap Not required

## 2.4 TRENCH DRAINS

### A. Trench Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Josam Company; Josam Div.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - d. Tyler Pipe; Wade Div.
  - e. Watts Drainage Products Inc.
  - f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3 for trench drains.
3. Material: Ductile or gray iron.
4. Flange: Anchor Seepage Not required.
5. Clamping Device: Not required Required.
6. Outlet: Bottom End Side.
7. Grate Material: Ductile iron Ductile iron or gray iron Gray iron Stainless steel
8. Grate Finish: Painted Not required.
9. Dimensions of Frame and Grate:
10. Top Loading Classification: Extra Heavy-Duty Heavy Duty Light Duty Medium Duty
11. Trap Material: Cast iron Stainless steel Not required
12. Trap Pattern: Standard P-trap Not required

## 2.5 ROOF FLASHING ASSEMBLIES

### A. Roof Flashing Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Acorn Engineering Company; Elmdor/Stoneman Div.
- b. Thaler Metal Industries Ltd.

B. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch- 6.0-lb/sq. ft., 0.0938-inch- thick, lead flashing collar and skirt extending at least 6 inches 8 inches 10 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

1. Open-Top Vent Cap: Without cap.
2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
3. Extended Vent Cap: With field-installed, vandal-proof vent cap.

## 2.6 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

### A. Through-Penetration Firestop Assemblies :

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. ProSet Systems Inc.

3. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
4. Size: Same as connected soil, waste, or vent stack.
5. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
6. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
7. Special Coating: Corrosion resistant on interior of fittings.

## 2.7 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

### A. Open Drains :

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping with increaser fitting of size indicated.

### B. Deep-Seal Traps :

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.

- a. NPS 2: 4-inch- minimum water seal.
- b. NPS 2-1/2 and Larger: 5-inch- minimum water seal.

C. Floor-Drain, Trap-Seal Primer Fittings :

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 side inlet.

D. Air-Gap Fittings :

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

E. Sleeve Flashing Device :

1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 1 inch 2 inches above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

F. Stack Flashing Fittings :

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

G. Vent Caps :

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

H. Frost-Resistant Vent Terminals :

1. Description: Manufactured or shop-fabricated assembly constructed of copper, lead-coated copper, or galvanized steel.
2. Design: To provide 1-inch enclosed air space between outside of pipe and inside of flashing collar extension, with counterflashing.

I. Expansion Joints :

1. Standard: ASME A112.21.2M.
2. Body: Cast iron with bronze sleeve, packing, and gland.
3. End Connections: Matching connected piping.
4. Size: Same as connected soil, waste, or vent piping.

## 2.8 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
  - 1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
  - 2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
  - 3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.
- B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:
  - 1. General Applications: 12 oz./sq. ft..
  - 2. Vent Pipe Flashing: 8 oz./sq. ft..
- C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch minimum thickness, unless otherwise indicated. Include G90 hot-dip galvanized, mill-phosphatized finish for painting if indicated.
- D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.
- E. Fasteners: Metal compatible with material and substrate being fastened.
- F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- G. Solder: ASTM B 32, lead-free alloy.
- H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.
- I. General requirements for motors are specified in Division 22 Section "Common Motor Requirements for Plumbing Equipment."
  - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
  - 2. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.
- C. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
  2. Locate at each change in direction of piping greater than 45 degrees.
  3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
  4. Locate at base of each vertical soil and waste stack.
- D. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- E. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- F. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
1. Position floor drains for easy access and maintenance.
  2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
    - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
    - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
    - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
  3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
  4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- G. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.
- H. Assemble and install ASME A112.3.1, stainless-steel channel drainage systems according to ASME A112.3.1. Install on support devices so that top will be flush with surface.
- I. Assemble non-ASME A112.3.1, stainless-steel channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.
- J. Assemble FRP channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.
- K. Assemble plastic channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.
- L. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- M. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- N. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.
- O. Assemble open drain fittings and install with top of hub 1 inch 2 inches above floor.

- P. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- Q. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
  - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
  - 2. Size: Same as floor drain inlet.
- R. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- S. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- T. Install vent caps on each vent pipe passing through roof.
- U. Install frost-resistant vent terminals on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.
- V. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.
- W. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.
- X. Assemble components of FOG disposal systems and install on floor. Install trap, vent, fresh-air inlet, and flow-control fitting according to authorities having jurisdiction. Install shelf fastened to reinforcement in wall construction and adjacent to unit, unless otherwise indicated. Install culture bottle, culture metering pump, timer, and control on shelf. Install tubing between culture bottle, metering pump, and chamber.
- Y. Install grease interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing.
  - 1. Above-Floor Installation: Set unit with bottom resting on floor, unless otherwise indicated.
  - 2. Flush with Floor Installation: Set unit and extension, if required, with cover flush with finished floor.
  - 3. Recessed Floor Installation: Set unit in receiver housing having bottom or cradle supports, with receiver housing cover flush with finished floor.
  - 4. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.
- Z. Install grease removal devices on floor. Install trap, vent, and flow-control fitting according to authorities having jurisdiction. Install control panel adjacent to unit, unless otherwise indicated.
- AA. Install oil interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing. Coordinate oil-interceptor storage tank and gravity drain with Division 23 Section "Facility Fuel-Oil Piping."
- BB. Install solids interceptors with cleanout immediately downstream from interceptors that do not have integral cleanout on outlet. Install trap on interceptors that do not have integral trap and are connected to sanitary drainage and vent systems.
- CC. Install wood-blocking reinforcement for wall-mounting-type specialties.

- DD. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
- EE. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. FOG Disposal Systems: Connect inlet and outlet to unit, connect flow-control fitting and fresh-air inlet piping to unit inlet piping, and connect vent piping between trap and media chamber. Connect electrical power.
- D. Grease Interceptors: Connect inlet and outlet to unit, and connect flow-control fitting and vent to unit inlet piping. Install valve on outlet of automatic drawoff-type unit.
- E. Grease Removal Devices: Connect controls, electrical power, factory-furnished accessories, and inlet, outlet, and vent piping to unit.
- F. Oil Interceptors: Connect inlet, outlet, vent, and gravity drawoff piping to unit; flow-control fitting and vent to unit inlet piping; and gravity drawoff and suction piping to oil storage tank.
- G. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- H. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
  - 1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
  - 2. Copper Sheets: Solder joints of copper sheets.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
  - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
  - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
  - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.

- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 07 Section "Sheet Metal Flashing and Trim."
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.
- G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

#### 3.4 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
  - 1. FOG disposal systems.
  - 2. Grease interceptors.
  - 3. Grease removal devices.
  - 4. Oil interceptors.
  - 5. Solids interceptors.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

#### 3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled FOG disposal systems and grease removal devices and their installation, including piping and electrical connections, and to assist in testing.
- B. Tests and Inspections:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

#### 3.6 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

## SECTION 221429

### SUMP PUMPS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following sump pumps and accessories, inside the building, for building storm drainage systems:

- 1. Packaged submersible, drainage pump units.

##### 1.3 SUBMITTALS

- A. Product Data: For each type and size of sump pump specified. Include certified performance curves with operating points plotted on curves, and rated capacities of selected models, furnished specialties, and accessories.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and Maintenance Data: For each sump pump to include in emergency, operation, and maintenance manuals.

##### 1.4 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of sump pumps and are based on the specific system indicated.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

##### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Retain shipping flange protective covers and protective coatings during storage.
- B. Protect bearings and couplings against damage.
- C. Comply with pump manufacturer's written rigging instructions for handling.

##### 1.6 COORDINATION

- A. Coordinate size and location of concrete bases and pits. Concrete, reinforcement, and formwork requirements are specified in Division 03.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 SUMP PUMP PITS (BY OTHERS)

- A. Description: Concrete pit with sump, pipe connections, curb frame, and separate cover.
- B. Sump: Construct of watertight, cast-in-place, reinforced concrete with sidewall openings for pipe connections. Cast-in-place concrete, formwork, and reinforcement are specified in Division 03 Section "Cast-in-Place Concrete Miscellaneous Cast-in-Place Concrete."
1. Pipe Connections: Sleeved openings large enough for mechanical sleeve seals for drainage piping. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing," and drainage piping is specified in Division 22 Section "Facility Storm Drainage Piping."

### 2.3 PACKAGED DRAINAGE PUMP UNITS

- A. Pedestal Units: Factory-assembled and -tested, single phase, oil minder, freestanding drainage pump unit.
1. Available Manufacturers:
    - a. Stancor.
    - b. American Machine & Tool Co.
    - c. Goulds Pumps; ITT Industries.
    - d. Liberty Pumps.
    - e. Little Giant Pump Co.
    - f. Myers, F. E.; Pentair Pump Group (The).
    - g. Sta-Rite Industries, Inc.
    - h. Zoeller Company.
  2. Pump Body: Corrosion-resistant material.
  3. Impeller: Aluminum or brass Aluminum, brass, or plastic.
  4. Motor: With built-in overload protection and mounted vertically on sump pump column. Comply with requirements in Division 22 Section "Common Motor Requirements for Plumbing Equipment."
  5. Power Cord: Three-conductor, waterproof cable of length required but not less than 72 inches, with grounding plug and cable-sealing assembly for connection at pump.
  6. Control: Float switch.
- B. Submersible Units: Factory-assembled and -tested, single phase, oil minder, freestanding drainage pump unit.
1. Available Manufacturers:

- a. ABS Pumps, Inc.
- b. Bell & Gossett Domestic Pump; ITT Industries.
- c. Goulds Pumps; ITT Industries.
- d. Grundfos Pumps Corp.
- e. Liberty Pumps.
- f. Little Giant Pump Co.
- g. McDonald, A. Y. Mfg. Co.
- h. Myers, F. E.; Pentair Pump Group (The).
- i. Sta-Rite Industries, Inc.
- j. Zoeller Company.
- k. Stancor.

- 2. Pump Body: Metal.
- 3. Impeller: Brass.
- 4. Pump Body: Plastic.
- 5. Impeller: Plastic.
- 6. Pump Seals: Mechanical type.
- 7. Motor: Hermetically sealed, capacitor-start type, with built-in overload protection. Comply with requirements in Division 22 Section "Common Motor Requirements for Plumbing Equipment."
- 8. Power Cord: Three-conductor, waterproof cable of length required but not less than 72 inches, with grounding plug and cable-sealing assembly for connection at pump.
- 9. Control: Motor-mounted float switch.
- 10. Basin: Plastic.

- a. Capacity: 2 gal 5 gal minimum.
- b. Inlet Connection: NPS 1-1/2 minimum.

C. Capacity and Characteristics:

- 1. Capacity: Total Dynamic Head: 45'
- 2. Discharge Pipe Size: 1-1/2"
- 3. Motor Horsepower: 1/2
- 4. Electrical Characteristics:
  - a. Volts: 120/208
  - b. Phases: Single Three.
  - c. Hertz: 60.

2.4 FLEXIBLE CONNECTORS

A. Available Manufacturers:

- 1. Anamet, Inc.
- 2. Flex-Hose Co., Inc.
- 3. Flexicraft Industries.
- 4. Flex-Pression, Ltd.
- 5. Flex-Weld, Inc.
- 6. Hyspan Precision Products, Inc.
- 7. Mercer Rubber.
- 8. Metraflex, Inc.
- 9. Proco Products, Inc.
- 10. Tozen America Corporation.
- 11. Unaflex Inc.

- B. Description: 125-psig minimum working-pressure rating and ends matching pump connection:
  - 1. Bronze Flexible Connectors: Corrugated, bronze inner tubing covered with bronze wire braid. Include copper-tube ends or bronze flanged ends, braze welded to tubing.
  - 2. Stainless-Steel Flexible Connectors: Corrugated, stainless-steel inner tubing covered with stainless-steel wire braid. Include stainless-steel nipples or flanges, welded to tubing.

## 2.5 BUILDING AUTOMATION SYSTEM INTERFACE

- A. Provide auxiliary contacts in pump controllers for interface to building automation system. Include the following:
  - 1. On-off status of each pump.
  - 2. Alarm status.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in of plumbing piping to verify actual locations of storm drainage piping connections before sump pump installation.

### 3.2 CONCRETE

- A. Install concrete bases of dimensions indicated for pumps and controllers. Refer to Division 22 Section "Common Work Results for Plumbing."
  - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of base.
  - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

### 3.3 SUMP PUMP INSTALLATION

- A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."
- B. Install pumps and arrange to provide access for maintenance including removal of motors, impellers, couplings, and accessories.
- C. Set submersible sump pumps on pit floor. Make direct connections to storm drainage piping.
- D. Install sump pump basins and connect to drainage piping. Brace interior of basins according to manufacturer's written instructions to prevent distortion or collapse during concrete placement. Set basin cover and fasten to basin top flange. Install cover so top surface is flush with finished floor.

- E. Connect to drainage piping to sump pit. Others to set pit curb frame recessed in and anchored to concrete. Others to fasten pit grate cover to pit curb flange. Others to install cover so top surface is flush with finished floor.
- F. Install packaged, pedestal, drainage pump units and make direct connection as shown on plbg dwgs.
- G. Install packaged submersible, drainage pump unit basins on floor or concrete base unless recessed installation is indicated. Make direct as shown on plbg dwgs.
- H. Support piping so weight of piping is not supported by pumps.

### 3.4 CONNECTIONS

- A. Piping installation requirements are specified in Division 22 Section "Facility Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to sump pumps to allow service and maintenance.
- C. Connect storm drainage piping to pumps. Install discharge piping equal to or greater than size of pump discharge piping. Refer to Division 22 Section "Facility Storm Drainage Piping."
  - 1. Install flexible connectors adjacent to pumps in discharge piping.
  - 2. Install check and shutoff valves on discharge piping from each pump. Install unions on pumps having threaded pipe connections. Install valves same size as connected piping. Refer to Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty valves for drainage piping.
- D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.5 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Verify bearing lubrication.
  - 3. Disconnect couplings and check motors for proper direction of rotation.
  - 4. Verify that each pump is free to rotate by hand. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
  - 5. Verify that pump controls are correct for required application.
- B. Start pumps without exceeding safe motor power:
  - 1. Start motors.
  - 2. Open discharge valves slowly.
  - 3. Check general mechanical operation of pumps and motors.
- C. Test and adjust controls and safeties.
- D. Remove and replace damaged and malfunctioning components.

1. Pump Controls: Set pump controls for automatic start, stop, and alarm operation as required for system application.
  2. Set field-adjustable switches and circuit-breaker trip ranges as indicated, or if not indicated, for normal operation.
- E. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train The City of New York's maintenance personnel to adjust, operate, and maintain controls and pumps. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 221429

SECTION 224000  
PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following conventional plumbing fixtures and related components:

1. Faucets for lavatories, showers and sinks.
2. Laminar-flow faucet-spout outlets.
3. Flushometers.
4. Toilet seats.
5. Protective shielding guards.
6. Fixture supports.
7. Water closets.
8. Urinals.
9. Lavatories.
10. Kitchen sinks.
11. Service sinks.

- B. Related Sections include the following:

1. Division 22 Section "Domestic Water Piping Specialties" for backflow preventers, floor drains, and specialty fixtures not included in this Section.
2. Division 22 Section "Drinking Fountains and Water Coolers."

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.
- D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.
- E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- F. FRP: Fiberglass-reinforced plastic.
- G. PMMA: Polymethyl methacrylate (acrylic) plastic.

- H. PVC: Polyvinyl chloride plastic.
- I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.
- B. LEED Submittal:
  - 1. Product Data for Credit WE 1: Documentation indicating flow and water consumption requirements.
- C. Shop Drawings: Diagram power, signal, and control wiring.
- D. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.
- E. Warranty: Special warranty specified in this Section.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
  - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities "Americans with Disabilities Act" for plumbing fixtures for people with disabilities.
- D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
  - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
  - 2. Plastic Shower Enclosures: ANSI Z124.2.
  - 3. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.

4. Slip-Resistant Bathing Surfaces: ASTM F 462.
5. Solid-Surface-Material Lavatories and Sinks: ANSI/ICPA SS-1.
6. Stainless-Steel Commercial, Handwash Sinks: NSF 2 construction.
7. Stainless-Steel Residential Sinks: ASME A112.19.3.
8. Vitreous-China Fixtures: ASME A112.19.2M.
9. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.

H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:

1. Faucets: ASME A112.18.1.
2. Hose-Connection Vacuum Breakers: ASSE 1011.
3. Hose-Coupling Threads: ASME B1.20.7.
4. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
5. NSF Potable-Water Materials: NSF 61.
6. Pipe Threads: ASME B1.20.1.
7. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
8. Supply Fittings: ASME A112.18.1.
9. Brass Waste Fittings: ASME A112.18.2.

I. Comply with the following applicable standards and other requirements specified for shower valves:

1. Backflow Protection Devices for Hand-Held Showers: ASME A112.18.3M.
2. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.
3. Deck-Mounted Bath/Shower Transfer Valves: ASME 18.7.
4. Faucets: ASME A112.18.1.
5. Hand-Held Showers: ASSE 1014.
6. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
7. Hose-Coupling Threads: ASME B1.20.7.
8. Manual-Control Antiscald Faucets: ASTM F 444.
9. Pipe Threads: ASME B1.20.1.
10. Pressure-Equalizing-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
11. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
12. Thermostatic-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.

J. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:

1. Atmospheric Vacuum Breakers: ASSE 1001.
2. Brass and Copper Supplies: ASME A112.18.1.
3. Plastic Tubular Fittings: ASTM F 409.
4. Brass Waste Fittings: ASME A112.18.2.
5. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.

K. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Flexible Water Connectors: ASME A112.18.6.
2. Floor Drains: ASME A112.6.3.
3. Hose-Coupling Threads: ASME B1.20.7.
4. Off-Floor Fixture Supports: ASME A112.6.1M.
5. Pipe Threads: ASME B1.20.1.
6. Plastic Toilet Seats: ANSI Z124.5.
7. Supply and Drain Protective Shielding Guards: ICC A117.1.

## PART 2 - PRODUCTS

### 2.1 LAVATORY FAUCETS

- A. Lavatory Faucets:
1. Refer to schedules at the end of this section for make and model.

### 2.2 SERVICE SINK FAUCETS

- A. Sink Faucets, MS:
1. Refer to schedules at the end of this section for make and model.
  2. Description: Service sink faucet with stops in shanks, vacuum breaker, hose-thread outlet, and pail hook. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.

### 2.3 Flushometers, WC, WC-A & UR, UR-A:

1. Refer to schedules at the end of this section for make and model.
2. Description: Flushometer for urinal & water-closet type fixtures. Include brass body with corrosion-resistant internal components, non-hold-open feature, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.

### 2.4 TOILET SEATS

- A. Toilet Seats, WC, WC-A:
1. Refer to schedules at the end of this section for make and model.
  2. Description: Toilet seat for water-closet-type fixture.

### 2.5 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Pipe Covers, LAV-A:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Engineered Brass Co.
    - b. Insul-Tect Products Co.; a Subsidiary of MVG Molded Products.
    - c. McGuire Manufacturing Co., Inc.
    - d. Plumberex Specialty Products Inc.
    - e. TCI Products.
    - f. TRUEBRO, Inc.
    - g. Zurn Plumbing Products Group; Tubular Brass Plumbing Products Operation.
  3. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.
- B. Protective Shielding Piping Enclosures, LAV-A:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. TRUEBRO, Inc.
  - b. Zurn.
  - c. Handy Shield.
3. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

## 2.6 FIXTURE SUPPORTS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Josam Company.
  2. MIFAB Manufacturing Inc.
  3. Smith, Jay R. Mfg. Co.
  4. Tyler Pipe; Wade Div.
  5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
  6. Zurn Plumbing Products Group; Specification Drainage Operation.
- C. Urinal Supports:
  1. Description: Supplied with fixture as provided by manufacturer.
  2. Accessible- Supplied with fixture as provided by manufacturer.
- D. Lavatory Supports:
  1. Description: Figure 0700-E with concealed arms, floor mounted with 'Pro-Set' Uprights.
- E. Sink Supports:
  1. Description: Mop Sinks are floor mounted. Kitchen Sinks are counter mounted, clips & stabilizers as provided by manufacturer.

## 2.7 WATER CLOSETS

- A. Water Closets, WC, WC-A:
  1. Refer to schedules at the end of this section for make and model.

## 2.8 URINALS

- A. Urinals, UR, UR-A:
  1. Refer to schedules at the end of this section for make and model.

## 2.9 LAVATORIES

- A. Lavatories, LAV, LAV-A:

1. Refer to schedules at the end of this section for make and model.

## 2.10 SERVICE SINKS

### A. Service Sinks, MS:

1. Refer to schedules at the end of this section for make and model.

## 2.11 KITCHEN SINKS

### A. Kitchen Sinks, SK-A:

1. Refer to schedules at the end of this section for make and model.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
  1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
  2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
  3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
- G. Install counter-mounting fixtures in and attached to casework.
- H. Install fixtures level and plumb according to roughing-in drawings.
- I. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- J. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- K. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- L. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- M. Install toilet seats on water closets.
- N. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- O. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- P. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- Q. Install shower flow-control fittings with specified maximum flow rates in shower arms.
- R. Install traps on fixture outlets.
  1. Exception: Omit trap on fixtures with integral traps.
  2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- S. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."
- T. Set shower receptors in leveling bed of cement grout. Grout is specified in Division 22 Section "Common Work Results for Plumbing."
- U. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

### 3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

### 3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Operate and adjust disposers hot-water dispensers and controls. Replace damaged and malfunctioning units and controls.
- C. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- D. Replace washers and seals of leaking and dripping faucets and stops.
- E. Install fresh batteries in sensor-operated mechanisms.

### 3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
  - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
  - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

### 3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by The City of New York.

## PLUMBING FIXTURE SCHEDULE

TAG	PRODUCT	MFG	MODEL	DESCRIPTION
WC(-A)	TOILET	AMERICAN STANDARD	HURON #3312.001	ELONGATED, FLOOR MTD, REAR EJECTION, FLUSH VALVE, TOP SPUD
	FLUSHOMETER	SLOAN	ECOS #8111-1.6/1	EXPOSED BATTERY OPERATED DUAL-FLUSH WATER CLOSET
	SEAT	OLSONITE	OLSONITE #95CT	ELONGATED, OPEN FRONT, W/O COVER
LAV(-A)	LAVATORY	KOHLER	SOHO K-2084	WALL MOUNT LAVATORY
	FAUCET	SLOAN	SLOAN #SF-2200-4	SENSOR ACTIVATED, ELECTRONIC, GOOSENECK HAND WASHING FAUCET FOR TEMPERED OR HOT/COLD WATER OPERATION
	CARRIER	JAY R. SMITH	SERIES 700	FLOOR MOUNTED (WITHIN WALL) CONCEALED ARM SUPPORTS
	DRAIN	KOHLER	K-7129-A	BRASS GRID DRAIN
MS	JANITORS SINK	ELKAY	EFS2523C	SERVICE SINK, FLOOR MODEL
	FAUCET	AMERICAN STANDARD	8341.076	SERVICE FAUCET
FD	FLOOR DRAIN	JAY R. SMITH	2005Y-F-08CP-B	INSTALLED FLUSH WITH FINISH FLOOR
UR-A	URINAL	ZURN	Z5798	WALL MOUNTED
	FLUSHOMETER	KOHLER	K-10949	EXPOSED BATTERY POWERED SENSOR ACTIVATED URINAL FLUSHOMETER
	CARRIER	JAY R. SMITH	SERIES 0636	FLOOR MOUNTED (WITHIN WALL)
SK-A	SINK	FRANKE	SSK753BX	TOP MOUNT STAINLESS STEEL
	FAUCET	CHICAGO FAUCETS	201-AHA8-317CP	BRASS DECK MOUNTED 8" WIDESPREAD
	STRAINER	KOHLER	K-8801	BRASS SINK STRAINER W/ TAILPIECE

## PLUMBING FIXTURE SCHEDULE (CONT'D)

TAG	SIZE	FINISH / COLOR	NOTES
WC(-A)	24-1/2" X 14" X 17-1/4"	VITREOUS CHINA / WHITE	
	N/A	SATIN CHROME	FULL FLUSH: LARGE BUTTON 1.6GPF REDUCED FLUSH: SMALL BUTTON 0.9.GPF
	N/A	WHITE	
LAV(-A)	20" X 18"	VITREOUS CHINA / WHITE	
	N/A	CHROME PLATED BRASS	WITH 4" TRIM PLATE FOR 4" CENTER SET SINK, AND BELOW DECK MECHANICAL MIXING VALVE. PROVIDE WITH 0.5 GPM AERATOR
	N/A	N/A	
	N/A	POLISHED CHROME	
MS	25" X 23" X 10"	SATIN-FINISH STAINLESS STEEL	
	N/A	POLISHED CHROME	2.2 GPM AERATOR
FD	N/A	CHROME PLATED	ROUND STRAINER WITH SMALL SQUARE HOLES
UR-A	18 1/2" X 14 1/4" X 25 5/8"	VITREOUS CHINA / WHITE	HIGH EFFICIENCY URINAL 0.125 GPF
	N/A	POLISHED CHROME	
	N/A	N/A	
SK-A	22" X 25" X 7 1/2"	SILK FINISH STAINLESS STEEL	
	N/A	POLISHED CHROME	2.2 GPM AERATOR
	N/A	POLISHED CHROME	

PLUMBING FIXTURE SCHEDULE (CONT'D)

TAG	LOCATION / RM #	ADA	ALTERNATE MANUFACTURERS
WC(-A)	WOMEN'S 106, MEN'S 107, STAFF 201, CHILDREN'S 202	ADA COMPLIANT	CRANE, TOTO
	WOMEN'S 106, MEN'S 107, STAFF 201, CHILDREN'S 202	ADA COMPLIANT	AMERICAN STANDARD, TOTO
	WOMEN'S 106, MEN'S 107, STAFF 201, CHILDREN'S 202	ADA COMPLIANT	AMERICAN STANDARD, TOTO
LAV(-A)	WOMEN'S 106, MEN'S 107, STAFF 201, CHILDREN'S 202	ADA COMPLIANT	CRANE, AMERICAN STANDARD
	WOMEN'S 106, MEN'S 107, STAFF 201, CHILDREN'S 202	ADA COMPLIANT	KOHLER, AMERICAN STANDARD
	WOMEN'S 106, MEN'S 107, STAFF 201, CHILDREN'S 202	N/A	TOTO, GEBERIT
	WOMEN'S 106, MEN'S 107, STAFF 201, CHILDREN'S 202	N/A	SLOAN, AMERICAN STANDARD
MS	JANITOR'S CLOSET 108		AMERICAN STANDARD, KOHLER
	JANITOR'S CLOSET 108	N/A	KOHLER, CHICAGO FAUCETS
FD	WOMEN'S 106, MEN'S 107	N/A	ZURN, WATTS
UR-A	MEN'S BATHROOM 107	ADA COMPLIANT	AMERICAN STANDARD: WASHBROOK 6590.125 SLOAN: WEUS-1000.1001-0.13
	MEN'S BATHROOM 107	ADA COMPLIANT	SLOAN, AMERICAN STANDARD
	MEN'S BATHROOM 107		TOTO, GEBERIT
SK-A	STAFF LOUNGE 305	ADA COMPLIANT	ELKAY, AMERICAN STANDARD
	STAFF LOUNGE 305	N/A	AMERICAN STANDARD, KOHLER
	STAFF LOUNGE 305	N/A	CHICAGO FAUCETS, AMERICAN STANDARD

END OF SECTION 224000

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## SECTION 224700

### DRINKING FOUNTAINS AND WATER COOLERS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following drinking fountain and related components:
  - 1. Drinking fountains.
  - 2. Fixture supports.
  - 3. Bottle filling stations.

##### 1.3 DEFINITIONS

- A. Accessible Drinking Fountain: Fixture that can be approached and used by people with disabilities.
- B. Cast Polymer: Dense, cast-filled-polymer plastic.
- C. Fitting: Device that controls flow of water into or out of fixture.
- D. Fixture: Drinking fountain or water cooler unless one is specifically indicated.
- E. Water Cooler: Electrically powered fixture for generating and delivering cooled drinking water.

##### 1.4 SUBMITTALS

- A. Product Data: For each fixture indicated. Include rated capacities, furnished specialties, and accessories.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For fixtures to include in emergency, operation, and maintenance manuals.

##### 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for fixtures for people with disabilities.

- C. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- D. ARI Standard: Comply with ARI's "Directory of Certified Drinking Water Coolers" for style classifications.
- E. ARI Standard: Comply with ARI 1010, "Self-Contained, Mechanically Refrigerated Drinking-Water Coolers," for water coolers and with ARI's "Directory of Certified Drinking Water Coolers" for type and style classifications.
- F. ASHRAE Standard: Comply with ASHRAE 34, "Designation and Safety Classification of Refrigerants," for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant, unless otherwise indicated.

#### 1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Filter Cartridges: Equal to percent of amount installed for each type and size indicated, but no fewer than of each.

### PART 2 - PRODUCTS

#### 2.1 DRINKING FOUNTAINS

- A. Drinking Fountains:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Elkay model LNFEM8K. Barrier-Free Electric Water Cooler or a comparable product by one of the following:
    - a. Elkay Manufacturing Co.
    - b. Haws
    - c. Filtrine Manufacturing Company; Drinking Water Division.
    - d. Halsey Taylor.
  - 2. Description: Accessible, Style W, wall-mounting drinking fountain.
    - a. Material: Bronze Metal Cast polymer Stainless steel Vitreous china complying with ASME 112.19.2M for drinking fountains with backsplash.
    - b. Receptor Shape: Rectangular Round Rounded front.
    - c. Back Panel: Stainless-steel wall plate behind drinking fountain.
    - d. Bubblers: One Two Three, with adjustable stream regulator, located on deck.
    - e. Control: Push button Push bar.
    - f. Supply: NPS 3/8 with ball, gate, or globe valve.
    - g. Drain: Grid with NPS 1-1/4 minimum horizontal waste and trap complying with ASME A112.18.2.
    - h. Support: Type I, water cooler carrier. Refer to "Fixture Supports" Article.
  - 3. Substituted products shall match the performance, appearance, material properties, and listings of the specified products.
- B. Bottle Filling Station
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Elkay EZH20 In-Wall with Chiller EZWSM8K or a comparable product by one of the following:

- a. Elkay Manufacturing Co.
- b. Haws
- c. Filtrine Manufacturing Company; Drinking Water Division.
- d. Halsey Taylor.

2. Substituted products shall match the performance, appearance, material properties, and listings of the specified products.

## 2.2 FIXTURE SUPPORTS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Josam Co.
  2. MIFAB Manufacturing, Inc.
  3. Smith, Jay R. Mfg. Co.
  4. Haws.
  5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
  6. Zurn Plumbing Products Group; Specification Drainage Operation.
- C. Description: Provide heavy duty galvanized steel mounting frame for the sturdy hidden support needed for the Hi-Lo Configuration.
  1. Type I: Hanger-type carrier with two vertical uprights.
  2. Type II: Bilevel, hanger-type carrier with three vertical uprights.
  3. Supports for Accessible Fixtures: Include rectangular, vertical, steel uprights instead of steel pipe uprights.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in for water and waste piping systems to verify actual locations of piping connections before fixture installation. Verify that sizes and locations of piping and types of supports match those indicated.
- B. Examine walls and floors for suitable conditions where fixtures are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLICATIONS

- A. Use carrier off-floor supports for wall-mounting fixtures, unless otherwise indicated.
- B. Use mounting frames for recessed water coolers, unless otherwise indicated.
- C. Set freestanding and pedestal drinking fountains on floor.
- D. Set remote water coolers on floor, unless otherwise indicated.

- E. Use chrome-plated brass or copper tube, fittings, and valves in locations exposed to view. Plain copper tube, fittings, and valves may be used in concealed locations.

### 3.3 INSTALLATION

- A. Install off-floor supports affixed to building substrate and attach wall-mounting fixtures, unless otherwise indicated.
- B. Install mounting frames affixed to building construction and attach recessed water coolers to mounting frames, unless otherwise indicated.
- C. Install fixtures level and plumb. For fixtures indicated for children, install at height required by authorities having jurisdiction.
- D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- F. Install pipe escutcheons at wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding pipe fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."
- G. Seal joints between fixtures and walls and floors using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

### 3.4 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.5 FIELD QUALITY CONTROL

- A. Water Cooler Testing: After electrical circuitry has been energized, test for compliance with requirements. Test and adjust controls and safeties.
  - 1. Remove and replace malfunctioning units and retest as specified above.
  - 2. Report test results in writing.

### 3.6 ADJUSTING

- A. Adjust fixture flow regulators for proper flow and stream height.

- B. Adjust water cooler temperature settings.

3.7 CLEANING

- A. After completing fixture installation, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
- B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

END OF SECTION 224700

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Section 230110

BASIC MECHANICAL & METHODS

PART 1 - GENERAL

1.1. SECTION INCLUDES

A. This Section includes the following basic mechanical materials and methods to complement other Division 230000 Sections.

1. Piping materials and installation instructions common to most piping systems.
2. Fire and smoke Detection
3. Sequencing and scheduling
4. Access Doors in Finished construction.
5. Dielectric Fittings.
6. Pipe and Pipe Fittings.
7. Joining Materials
8. Piping Specialties
9. Labeling and identifying mechanical systems and equipment is specified in Division 23000.
10. Grout for equipment installations.
11. Drive Guards
12. Electrical Motors, Motor Controls and Wiring
13. Fire stopping
14. Tools and Lubricants
15. Dampers - General
16. Damper Terminal Strips
17. Automatic Control Valves - General
18. Piping Systems - Common Requirements.
19. Pressure Testing - All Piping Systems.
20. Equipment Installation - Common Requirements.
21. Labeling and Identifying
22. Painting and finishing.
23. Pans and Drains over Electrical Equipment.
24. Concrete Bases
25. Erection of Metal Supports and Anchorage
26. Welding procedure.
27. Catwalks, platforms and ladders.
28. Excavation and backfill.

B. Pipe and pipe fitting materials are specified in piping system Sections.

1.2. RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and the Supplementary Conditions and Division 1 Specification Sections, apply to this and other sections of Division 230000.
- B. Section 078413, FIRESTOPPING.
- C. Division 023000, MECHANICAL
- D. Division 026000, ELECTRICAL

E. Other Sections where applicable.

1.3. QUALITY ASSURANCE

A. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel."

B. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions of ASME B31 Series "Code for Pressure Piping."

2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.

C. Products Criteria:

1. All equipment furnished as part of the work shall comply with the latest editions of all applicable state and municipal "energy codes." Provide certification from the equipment suppliers for all energy-consuming equipment that the equipment fully complies with these codes. Equipment submissions will not be accepted for review unless accompanied by such certification in writing.

2. All equipment and materials shall be new and without blemish or defect.

3. New equipment and materials shall be Underwriters Laboratories, Inc. (U.L.) labeled and/or listed where specifically called for, or where normally subject to such U.L. labeling and/or listing services.

4. All equipment and materials shall be free of asbestos.

5. Electrical equipment and materials shall be products which will meet with the acceptance of the agency inspecting the electrical work. Where such acceptance is contingent upon having the products examined, tested and certified by Underwriters or other recognized testing laboratory, the product shall be examined, tested and certified.. Where no specific indication as to the type or quality of materials or equipment is indicated, a first class standard article shall be furnished.

6. It is the intent of these specifications that wherever a specific manufacturer of a product is specified or scheduled, and the specifications include other approved manufacturers or the terms "other approved" or "or approved equal" or "equal" are used, the submitted item must conform in all respects to the specified item. Consideration will not be given to claims that the submitted item meets the performance requirements with lesser construction (such as lesser heat exchange surface, smaller motor HP, etc.). Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance. In many cases equipment is oversized to allow for pick-up loads which cannot be delineated under the minimum performance.

7. All equipment of one type (such as fans, pumps, coils, etc.), shall be the products of one Manufacturer.

8. Substituted equipment or optional equipment where permitted and approved, must conform to space requirements. Any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems as a result of substitutions shall be made at the Contractor's expense.

9. Note that the approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not assure that the Commissioner attests to the dimensional accuracy or dimensional suitability of the material or equipment involved or the ability of the material or equipment involved or the mechanical performance of equipment. Approval of Shop Drawings does not invalidate the plans and specifications if in conflict, unless a letter requesting such change is submitted and approved on the Commissioner's letterhead.

10. Substitutions of Mechanical Equipment for that shown on the schedules or designated by model number in the specifications will not be considered if the item is not a regular cataloged item shown in the current catalog of the manufacturer.

- D. **Manufacturer's Recommendations:** Where installation procedures of any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.
- E. This project requires the contractor to implement practices and procedures to meet the environmental performance goals for the project, which include achieving leed™ certification. Specific project goals which may impact this and the other sections of this specification include: use of materials with recycled-content; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the contractor or his subcontractors, shall not be allowed if such changes compromise the stated green building criteria or usgb guidelines.

#### 1.4. DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.
- B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.
- C. Protect flanges, fittings, and piping specialties from moisture and dirt.
- D. Protect stored plastic pipes from direct sunlight. Support to prevent sagging and bending.

#### 1.5. PROTECTION AND CLEANING

- A. It shall be this trade's responsibility to store his materials in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets or racks, and covered with tarpaulins.
- B. The inlet and discharge openings of all fan coil, VAV Box and other terminal units shall be kept covered until all local plastering, parging, etc. is completed, and the units are ready to run.
- C. Equipment and material if left in the open and damaged shall be repainted, or otherwise refurbished at the discretion of the City of New York. Equipment and material is subject to rejection and replacement if in the opinion of the Commissioner, or in the opinion of the manufacturer's engineering department, the equipment has deteriorated or been damaged to the extent that its immediate use is questionable, or that its normal life expectancy has been curtailed.
- D. During the erection protect all ductwork, duct lining, insulation, piping, and equipment from damage and dirt. Cap the open top of all ductwork and piping installed vertically.
- E. After completion of project, clean the exterior surface of all equipment included in this division of work including, but not limited to, concrete residue.

- F. Chemical Cleaning: All piping systems shall be thoroughly flushed out with the approved cleaning chemicals to remove pipe dope, slushing compounds, cutting oils, and other loose extraneous materials. This also includes any piping systems which are not listed as requiring water treatment. The cleaning chemicals shall be added by the mechanical trade. The chemical supplier shall verify that the chemicals are compatible with all the materials in the systems. The chemical supplier shall instruct as to the proper feed rates, shall check that the cleaning solution is actually in each system, shall instruct the contractor as to when to flush the system and shall check each system following flushing to insure all cleaning chemicals have been removed from each system. The mechanical trade shall block open all modulating valves, zone valves and all other system restrictions. If building pumps are not available, this trade shall provide portable pumps to circulate water for cleaning.
- G. A certificate of cleaning shall be provided by the cleaning chemical supplier to the Commissioner's representative.

#### 1.6. FIRE AND SMOKE DETECTION

- A. Fire and smoke detection system will be provided and installed by the Electrical trade. The HVAC trade will provide suitable openings (as recommended by the Smoke Detection System Manufacturer) in sheet metal for sensing elements.
- B. This Trade will provide access doors to make all such detection heads accessible.
- C. This trade will provide bracing for smoke detection sampling tubes which exceed 48" in length.

#### 1.7. SEQUENCING AND SCHEDULING

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
- E. Coordinate connection of electrical services.
- F. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors."
- H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

#### PART 2 - PRODUCTS

2.1. CENTRAL CONTROL PANELS

- A. Provide panel for alarm and start-stop functions.
- B. Provide panel for alarm functions.
- C. See drawings for details.

2.2. ACCESS DOORS IN FINISHED CONSTRUCTION

- A. Access doors as required for operation and maintenance of concealed equipment, valves, controls, etc will be provided by another trade.
- B. This Trade is responsible for access door location, size and its accessibility to the valves or equipment being served.
- C. Coordinate and prepare a location, size, and function schedule of access doors required and deliver to a representative of the installing Trade. Furnish and install distinctively colored buttons in finished ceiling.
- D. Access doors shall be of ample size, minimum of 16" x 16".
- E. Construct doors and frames to comply with the requirements of the NFPA and Underwriters Laboratories Inc. for fire rating. Install UL label on each door in a non-exposed location unless otherwise required by the local authority having jurisdiction.

2.3. DIELECTRIC FITTINGS

- A. Provide dielectric fittings to isolate joined dissimilar materials to prevent galvanic action and stop corrosion. Fittings shall be of the non reducing type, which shall be suitable for the system fluid, pressure, and temperature and shall not restrict the flow.
- B. For factory fabricated equipment, manufacturer shall submit method of compliance or exceptions (if applicable) in writing as part of the shop drawings submission for review and approval by Commissioner.
- C. It is the intent of this section that all system components (equipment connections, piping, etc.). Whether they are field installed or factory fabricated shall comply with paragraph A above.
- D. See paragraph, PIPING SPECIALTIES, for additional details.

2.4. PIPE AND PIPE FITTINGS

- A. Also refer to individual piping system specification Sections for pipe and fitting.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.5. JOINING MATERIALS

- A. Refer to individual piping system specification Sections in Division 23000 for special joining materials not listed below
- B. Pipe Flange Gasket Materials: Suitable for the chemical and thermal conditions of the piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3mm) maximum thickness, except where thickness or specific material is indicated.
  2. ASME B16.20 for grooved, ring-joint, steel flanges.
  3. AWWA C110, rubber, flat face, 1/8 inch (3 mm) thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where other material is indicated.
- D. Plastic Pipe Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, except where other type or material is indicated.
- E. Solder Filler Metal: ASTM B 32.
- F. Fittings for copper tubing shall be Chase Sweat Fittings, Mueller Brass Co.'s "Streamline" solder fittings, or "Arco" wrought-copper fittings. "T"-Drill type fittings are not acceptable. All piping shall be installed in a workmanlike manner, according to the manufacturer's instruction. All joints shall be thoroughly cleaned before connecting. All solder for copper tubing shall have a melting point of not less than 460 degrees F., composed of 95% tin and 5% antimony, or brazing filler metal melting at or above 1000EF (silver or copper-phosphorus) in accordance with the following table. Regardless of pressures in table below, use 95-5 tin antimony for fresh water.

SAFE STRENGTH OF SOLDERED JOINTS Pressure Ratings Maximum Service Pressure,  
PSI Water

Service Tempera- Solder used in Joints	tures Deg. F.	1/4 to	1-1/4 to	2-1/2 to	6 inches
		1 inch Incl.	2 inches Incl.	4 inches Incl.	
95-5 Tin	100	500	400	300	260
Antimony	150	400	350	275	260
	200	300	250	200	250
	250	200	175	150	250

Brazing Filler 250 300 210 170 150 Metal\* at or 350 270 190 155 150 above 1000EF

\* For service temperatures 200E and below, the rated internal pressure is equal to that of tube being joined.

- G. Brazing Filler Metals: AWS A5.8.
1. BCuP Series: Copper-phosphorus alloys.
  2. BAg1: Silver alloy.
- H. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- I. Solvent Cements: Manufacturer's standard solvents complying with the following:
1. Acrylonitrile-Butadiene-Styrene (ABS): ASTM D 2235.
  2. Chlorinated Poly(Vinyl Chloride) (CPVC): ASTM F 493.
  3. Poly (Vinyl Chloride) (PVC): ASTM D 2564.
  4. PVC to ABS Transition: Made to requirements of ASTM D 3138, color other than orange.
- J. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.

- K. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon steel bolts and nuts.
- L. Couplings: Iron body sleeve assembly, fabricated to match outside diameters of plain-end pressure pipes.
  - 1. Sleeve: ASTM A 126, Class B, gray iron.
  - 2. Followers: ASTM A 47 (ASTM A 47M), Grade 32510 or ASTM A 536 ductile iron.
  - 3. Gaskets: Rubber.
  - 4. Bolts and Nuts: AWWA C111.
  - 5. Finish: Enamel paint.

## 2.6. PIPING SPECIALTIES

- A. Provide escutcheons on all exposed piping passing through walls, floors, partitions and ceilings, except provide close fitting metal escutcheons on both sides of piping (whether exposed or not) through required fire rated walls, floors, partitions & ceilings.
- B. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.
  - 1. Inside Diameter: Closely fit around pipe, tube, and insulation.
  - 2. Outside Diameter: Completely cover opening.
  - 3. Cast Brass: One-piece, with set-screw.
- C. Dielectric Fittings: Assembly or fitting, non-reducing type, having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.
  - 1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
  - 2. Insulating Material: Suitable for system fluid, pressure, and temperature, does not restrict flow.
  - 3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig minimum working pressure at a 180 deg F temperature.
  - 4. Dielectric Flanges: Factory-fabricated, companion-flange assembly for 150-psig minimum pressure to suit system pressures.
  - 5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
- D. Mechanical Sleeve Seals: Modular, watertight mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when tightened.
- E. Sleeves: The following materials are for all wall, floor, slab, and roof penetrations:
- F. Sleeve Materials
  - 1. Type Designation Sleeve Material
    - a. #18 gauge, galvanized steel.
    - b. Standard weight galvanized steel pipe.
    - c. Standard weight galvanized steel pipe with a continuously welded water stop of 1/4" steel plate extending from outside of sleeve a minimum of 2" all around - similar to F & S Mfg. Corp. Fig. 204.

- d. Cast iron pipe sleeve with center flange - similar to James . Clow & Sons No. F-1430 and F-1435.
- e. Standard weight galvanized steel pipe with flashing clamp device welded to pipe sleeve or watertight sleeves - similar to Zurn 195-10 with oakum caulking as required.
- f. Metal deck and wall sleeves similar to Adjust-To-Crete Mfg. Co.

G. Sleeve Sizes

- 1. Floors and required fire rated partitions - 1/2" maximum clearance between outside of pipe (or insulation on insulated pipes) and inside of sleeve.
- 2. Partitions not fire rated - 1-1/2" maximum clearance between outside of pipe (or insulation on insulated pipes) and inside of sleeve.

H. Sleeve Lengths

<u>Location</u>	<u>Sleeve Length</u>
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Floors	Equal to depth of floor construction including finish. In waterproof floor construction sleeves to extend minimum of 2" above finished floor level.
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Roofs	Equal to depth of roof construction including insulation.
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Walls & Partitions	Equal to depth of construction and terminated flush with surfaces.
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I. Sleeve Caulking & Packing.

- 1. Type Designation Caulking & Packing Requirements A Space between pipe and sleeve packed with oakum or hemp and caulked watertight.
- 2. Space between pipe or pipe covering and sleeve shall be caulked with an incombustible, permanently plastic, waterproof non-staining compound leaving a finished smooth appearance or pack with mineral wool or other equally approved fire resistive material to within 1/2" of both wall faces and provide caulking compound as per above.

2.7. IDENTIFYING DEVICES AND LABELS

- A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 23000 Sections. Where more than one type is specified for listed application, selection is Installer's option, but provide single selection for each product category.
- B. Equipment Nameplates: Metal nameplate with operational data engraved or stamped, permanently fastened to equipment.
  - 1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data.
  - 2. Location: An accessible and visible location.
- C. Stencils: Standard stencils, prepared for required applications with letter sizes conforming to recommendations of ASME A13.1 for piping and similar applications, but not less than 1-1/4-inch (30mm) -high letters for ductwork and not less than 3/4-inch (19mm) -high letters for access door signs and similar operational instructions.
  - 1. Material: Fiberboard.
  - 2. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.
  - 3. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ASME A13.1 for colors.

- D. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, conforming to ASME A13.1.
- E. Plastic Duct Markers: Manufacturer's standard laminated plastic, color coded duct markers. Conform to following color code:
1. Green: Cold air.
  2. Yellow: Hot air.
  3. Yellow/Green: Supply air.
  4. Blue: Exhaust, outside, return, and mixed air.
  5. For hazardous exhausts, use colors and designs recommended by ASME A13.1.
  6. Nomenclature: Include following:
- F. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white (letter color) melamine sub-core, except when other colors are indicated.
1. Fabricate in sizes required for message.
  2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.
  3. Punch for mechanical fastening.
  4. Thickness: 1/8 inch (3 mm), except as otherwise indicated.
  5. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.
- G. Plastic Equipment Markers: Laminated-plastic, color-coded equipment markers. Conform to following color code:
1. Green: Cooling equipment and components.
  2. Yellow: Heating equipment and components.
  3. Yellow/Green: Combination cooling and heating equipment and components.
  4. Brown: Energy reclamation equipment and components.
  5. Blue: Equipment and components that do not meet any of the above criteria.
  6. For hazardous equipment, use colors and designs recommended by ASME A13.1.
  7. Nomenclature: Include following, matching terminology on schedules as closely as possible:
  8. Size: Approximately 2-1/2 by 4 inches (65 by 100 mm) for control devices, dampers, and valves; and 4-1/2 by 6 inches (115 by 150 mm) for equipment.
- H. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering, and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.
1. Multiple Systems: Where multiple systems of same generic name are indicated, provide identification that indicates individual system number as well as service such as "Boiler No. 3," "Air Supply No. 1H," or "Standpipe F12."

## 2.8. GROUT

- A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.
1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.

2. Design Mix: 5000-psi (34.50MPa), 28-day compressive strength.
3. Packaging: Premixed and factory-packaged.

#### 2.9. DRIVE GUARDS

- A. For all machinery and equipment provide guards for belts, chains, couplings, pulleys, sheaves, shafts, gears and other moving parts regardless of height above the floor.
- B. Materials: Sheet steel, cast iron, expanded metal or heavy gauge wire mesh rigidly secured so as to be removable without disassembling pipe, duct, or electrical connections to equipment.
- C. Access for Speed Measurement: One inch diameter hole at each shaft center.

#### 2.10. ELECTRICAL MOTORS, MOTOR CONTROLS, AND WIRING

- A. For all work required in conjunction with electrical motors, motor controls, and wiring, see complete delineation on the drawings under the title of "List of Electric Motors and Motor Controls" and the notes pertaining to same. Note that all motors, starters & motor control centers are purchased by the HVAC Trade. Motors for equipment shall be provided by the Equipment Manufacturer. All equipment shall have U.L. label where obtainable.
- B. See "Automatic Controls" for separation of work for control wiring between Electrical and HVAC trades

#### 2.11. FIRE-STOPPING

- A. Refer to Section, FIRESTOPPING.
- B. HVAC trade is responsible for firestopping of HVAC work.
- C. Firestopping system must be U.L. approved.
- D. All spaces between ducts or pipes and their respective sleeves shall be packed full depth with mineral wool, or other equally approved fire resistant material, and compressed firmly in place. Fiberglass shall not be used. Sleeve clearances shall not exceed ½ inch between pipes (or ducts) and sleeves. Use individual sleeves for each pipe or duct. Use escutcheons on both sides of sleeves. This includes spaces between ducts on pipes and their respective sleeves or openings at fan rooms (whether walls are fire rated or not).

#### 2.12. TOOLS AND LUBRICANTS

- A. Furnish special tools not readily available commercially, that are required for disassembly or adjustment of equipment and machinery furnished.
- B. Lubricants: A minimum of one quart of oil, and one pound of grease, of equipment manufacturer's recommended grade and type, in unopened containers and properly identified as to use for each different application.

#### 2.13. DAMPERS - GENERAL

- A. All electric and/or pneumatic operated dampers which have a fire and/or smoke rating shall be furnished by the mechanical contractor. All other electric and/or pneumatic operated dampers shall be furnished by the Controls (ATC/BMS) Contractor. Fusible link dampers for fire protection, manual dampers for balancing and/or shut-off as well as dampers which are specified

as part of factory built air handling units or terminal units shall be furnished by the mechanical contractor. All dampers shall be installed by the mechanical contractor.

- B. Type "B" or "C" mountings shall be used for all dampers. Type "A" mountings are not permitted. All dampers are to be selected and installed so that the frames, stops, etc. are located outside of the airstream so as to provide a nominal 100% free area damper.
- C. The mechanical contractor shall furnish damper actuators for all dampers that he furnishes. Where practical, actuators shall be factory mounted by the damper manufacturer. The actuators shall be located outside of the airstream. The mechanical contractor shall provide a terminal strip alongside the damper for all dampers he furnishes.
- D. The controls contractor shall furnish damper actuators for all dampers that he furnishes. Where practical, actuators shall be factory mounted by the damper manufacturer. The actuators shall be located outside of the airstream. The controls contractor shall provide a terminal strip along side the damper for all dampers he furnishes.
- E. Wiring for motor operated dampers that have a fire and/or smoke rating shall be provided by the mechanical trade from the damper actuator and any associated end switches and sensors to a terminal strip that is wall mounted along side the damper.
- F. The controls contractor shall provide wiring as follows:
  - 1. Between the central control system BMS and the terminal strip for all dampers monitored and/or controlled by the BMS whether or not the controls contractor has furnished the damper.
  - 2. Between the terminal strip for all dampers and their associated thermostats, pressure switches, etc. whether or not the control contractor has furnished the damper.
- G. Dampers incorporating multiple sections shall be controlled in unison. Where more than one (1) actuator serves a damper, then the actuators shall be driven in unison and the control wiring shall be provided accordingly.
- H. Dampers incorporating multiple sections shall be designed in such a way that the actuators are easily accessible. Under no circumstances shall it be necessary to remove damper sections or structural or other fixtures to facilitate removal of damper motors. Provide access doors wherever necessary to meet this requirement.
- I. The following table summarizes the trade responsibilities with respect to automatic dampers:

items	Non fire or smoke rated Dampers	Fire/Smoke rated Dampers controlled by BMS or ATC	Fire /Smoke dampers controlled by fire Alarm
Furnish Damper	Control Vendor	Mech. Contr.	Mech. contr.
Install damper	Mech. contr.	Mech. Contr.	Mech. Contractor.
Furnish Actuator(s)	Control Vendor	Mech. contract.	Mech. contractor.
Install & furnish complete with all relays, wiring, etc	Control vendor	Mech. Contractor	Mech. Contractor.

Provide wiring btw actuators, end switches, heat sensors, & terminal strip	Control vendor	Mech. Contractor	Mech. contractor.	
Provide wiring from BMS to damper terminal strip	Control vendor	Control vendor	Control vendor	
Provide wiring from FAS to damper terminal strip	Electrical Contrat.	Electrical contract	Electrical contract	
Furnish 120 V to elect. Actuators	Control	Control	Electrical	
Wiring from damper terminal to terminal strip of interlock motors, etc	Control	control	Control	
Provide wiring from dampers terminal directly to thermostat, etc	control	control	Control	

#### NOTES

1. Controls contractor shall have overall responsibility for the complete coordination of the work and the operation of the damper/actuator installation.
2. In mechanical rooms 120V power circuits will be provided from an emergency distribution board. These circuits will be terminated in a junction box located in each associated mechanical room and shall be used by the controls contractor to supply local control panels and critical equipment. These circuits will also be used by the electrical trade to supply dampers, etc., requiring control by the Fire Alarm System. Final connection from the terminal strips to the actuators, end switches and sensors shall be by the mechanical trade.
3. For dampers not requiring control by the fire alarm system and for other non-critical equipment, obtain power from either the emergency circuits as detailed above or from the motor starter terminal trip. All wiring shall be by the controls contractor.

#### 2.14. DAMPER TERMINAL STRIPS

- A. Terminal strip(s) shall be provided along side all motorized dampers. If the damper has a smoke and/or fire rating, the terminal strip shall be provided by the Mechanical Trade. If the damper does not have a fire and/or smoke rating then the terminal strip shall be provided by the controls contractor.
- B. Where dampers are furnished by the controls contractor then he shall provide relays, interconnect wiring and other components to meet the requirements detailed below. The terminal strip(s) relays, etc., shall be housed in wall mounted enclosures which meet the specifications detailed for local starter enclosures.
- C. The terminal strip shall be wired such that the Central Control System (ATC/BMS) can undertake the following control and monitoring functions:

1. Open Control - A pair of terminals shall be wired such that when a controls (ATC/BMS) relay closes a contact pair across these terminals the damper is driven open. If the damper is two positions with an actuator which drives closed and springs open on loss of power then these terminals shall not be used. This signal from the Central Control System (ATC/BMS) shall be overridden by a close signal from the Fire Alarm System (FAS) Where dampers are interlocked to motors then the wiring shall be to these terminals.
2. Close Control - A pair of terminals shall be wired such that when a controls (ATC/BMS) relay closes a contact pair across these terminals the damper is driven closed. If the damper is two position with an actuator which drives open and springs closed on loss of power then these terminals shall not be used. This signal from the Central Control System (ATC/BMS) shall be overridden by an open signal from the FAS.
3. Motor Interlock - A pair of terminals shall be wired to an end switch on the actuator such that the contacts between the terminals shall be closed when the damper is fully open and open when the damper is not fully open. This pair of terminals shall be used for interlocking a damper with a motor such that the motor will not be able to start if the damper is not fully open.

D. Purge Dampers

1. For each damper which is to be monitored and/or controlled by the Fire Alarm System (FAS), the damper actuator, heat sensor and end switches shall each be wired by the mechanical trade to a terminal strip(s) mounted adjacent to the damper so that the FAS can undertake the following control and monitoring functions:
  - a. FAS "Open/Close" Control - The damper will be driven open in response to closure of an FAS relay contact and will spring closed in response to opening of this relay contact.
  - b. FAS "Override Open" Control (Smoke Purge Dampers Only) - The damper will be re-opened, subsequent to a heat sensor initiated closure, in response to closure of a second FAS relay contact (or reclosure of the first contact for single sensor dampers).
  - c. FAS "Open/Closed" Status Monitoring Control (Smoke Purge Dampers Only) - End Switch closures will cause activation of FAS "opened" and "closed" relays in response to operation of end switches at both ends of travel.
  - d. FAS "Override of ATC (BMS)" Control - For each damper requiring both FAS and ATC (BMS) control, the Controls Contractor shall mount an interface relay within 30 circuiting feet of the damper terminal strip, so wired as to permit FAS override of the ATC (BMS) control.
- E. The controls contractor's damper manufacturer shall provide all necessary wiring diagrams to the FAS contractors.
- F. Dampers furnished by the mechanical trade shall have similar terminal strips to which the controls contractor shall wire where necessary.
- G. Comply with code requirements. Segregate high and low voltage wiring & circuits and segregate the FAS and controls (ATC/BMS) terminals.

2.15. AUTOMATIC CONTROL VALVES - GENERAL

- A. All automatic control valves controlled by the central control system (ATC/BMS) shall be furnished by the controls contractor unless noted otherwise in these documents.
- B. All automatic control valves shall be installed by the mechanical trade.
  1. The controls contractor shall provide wiring as follows:

2. All line voltage power for electric valve actuators shall be wired by the controls contractor from the nearest available power panel. Coordinate with electrical trade.
  3. All wiring between the central control system (ATC/BMS) and the valve actuator shall be wired by the controls contractor.
  4. All wiring between the valve actuator and their associated thermostats, pressure switches, control devices, etc. shall be wired by the controls contractor.
- C. All wiring shall comply with code requirements. Segregate high and low voltage wiring & circuits and segregate the FAS and controls (ATC/BMS) terminals.

## PART 3 - EXECUTION

### 3.1. PIPING SYSTEMS--COMMON REQUIREMENTS General

- A. General: Install piping as described herein, except where system Sections specify otherwise. Individual piping system specification Sections in Division 23000 specify piping installation requirements unique to the piping system.
- B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordination drawings.
- C. Coordinate location of piping, sleeves, inserts, hangers, ductwork and equipment. Locate piping, sleeves, inserts, hangers, ductwork and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Follow manufacturer's published recommendations for installation methods not otherwise specified.
- D. Install gages, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gages to be easily read by operator or staff standing on floor or walkway provided. Servicing shall not require dismantling adjacent equipment or pipe work.
- E. Furnish and install all necessary float devices, aquastats, thermostats, pressure sensors, etc. required for alarm indication as indicated on the HVAC Motor Controls Specifications sheet.
- F. Install piping at required slope.
- G. Install components having pressure rating equal to or greater than system operating pressure.
- H. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.
- I. Install piping free of sags and bends.
- J. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.
- K. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.
- L. Install piping to allow application of insulation plus 1-inch (25mm) clearance around insulation.
- M. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

- N. Install fittings for changes in direction and branch connections.
- O. Install couplings according to manufacturer's printed instructions.
- P. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings according to the following:
  - 1. Chrome-Plated Piping: Cast-brass, one-piece, with set-screw, and polished chrome-plated finish. Use split-casting escutcheons, where required, for existing piping.
  - 2. Un-insulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with set-screw.
  - 3. Un-insulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.
  - 4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips, and chrome-plated finish.
  - 5. Piping in Utility Areas: Cast-brass or stamped-steel, with set-screw or spring clips.
- Q. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs, and where indicated.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
  - 2. Build sleeves into new walls and slabs as work progresses.
- R. Refer to piping insulation for proper R- value insulation per min code compliance.
- S. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping sealant material. Firestopping materials are specified in Division 7 Section "Firestopping."
- T. Verify final equipment locations for roughing in.
- U. Refer to equipment specifications in other Sections for roughing-in requirements.
  - 1. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping system Sections.
  - 2. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
  - 3. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
  - 4. Soldered Joints: Construct joints according to AWS "Soldering Manual," Chapter 22 "The Soldering of Pipe and Tube."
  - 5. Brazed Joints: Construct joints according to AWS "Brazing Manual" in the "Pipe and Tube" chapter.
  - 6. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:
  - 7. Welded Joints: Construct joints according to AWS D10.12 "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to the "Quality Assurance" Article.
  - 8. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
  - 9. Plastic Pipe and Fitting Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following standards:

10. Plastic Pipe and Fitting Heat-Fusion Joints: Prepare pipe and fittings and join with heat-fusion equipment according to manufacturer's printed instructions.
- V. Piping Connections: Except as otherwise indicated, make piping connections as specified below.
1. Install unions in piping 2 inches (50 mm) and smaller adjacent to each valve and at final connection to each piece of equipment having a 2-inch (50mm) or smaller threaded pipe connection.
  2. Install flanges in piping 2-1/2 inches (65 mm) and larger adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
  3. Wet Piping Systems (Water and Steam): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.
- W. All welding elbows shall be long radius elbows as manufactured by Tube Turn, ANSI B16.9.
- X. Where welding is used, fittings shall be Tube Turn, Bonney Forge, Taylor Forge, Ladish, or other approved manufacture, ANSI B-16.9. Welding end fittings shall have the same bursting pressure as pipe of the same size and schedule. Tee fittings shall be one piece except that weldolets are permitted where branches are at least one pipe size less than the main.
- Y. All cast iron fittings shall be Stockham, Grinnell, or other approved.

### 3.2. PRESSURE TESTING - ALL PIPING SYSTEMS

- A. Water shall not be introduced into piping systems for testing without water treatment. All piping systems shall be tested to a hydrostatic pressure at least 1-1/2 times the maximum operating pressure (but not less than 40 lbs. per sq. in.) for a sufficiently long time, but not less than 4 hours, to detect all leaks and defects. Where necessary, piping shall be tested in sections to permit the progress of the job.
- B. Hydrostatic Testing Corrosion Inhibitor
1. If sections of system must be hydrostatically tested prior to cleanout, appropriate inhibitor shall be added to the test water at sufficient level to totally passivate metal and provide protective film on pipe surfaces to prevent corrosion prior to cleanout and treatment.
  2. Mechanical Contractor shall be responsible to coordinate this treatment with the water treatment contractor. At no time shall the Mechanical Contractor add water to a system without treatment.

### 3.3. EQUIPMENT INSTALLATION--COMMON REQUIREMENTS

- A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.
- B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Commissioner.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.
- D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

- E. Install equipment giving right-of-way to piping systems installed at a required slope.

### 3.4. LABELING AND IDENTIFYING

- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.

1. Stenciled Markers: Complying with ASME A13.1.
2. Plastic markers, with application systems. Install on pipe insulation segment where required for hot non-insulated pipes.
3. On exposed piping apply bands on 30 foot centers of straight runs, at valve locations, at points where piping enters and leaves a partition, wall, floor or ceiling.
4. On concealed piping installed above removable ceiling construction apply bands in manner described for exposed piping.
5. On concealed piping installed above non-removable ceiling construction, or in pipe shafts, apply bands at valve or other devices that are made accessible by means of access doors or panels.
6. Apply bands at exit and entrance points to each vessel, tank or piece of equipment.
7. Band widths shall be 8" for pipes up to 10 inch diameter and 16" wide for larger diameter piping. Letter heights stating service shall be preprinted on band 3/4" high for 8 inch bands and 1-1/2" high for 16 inch bands.
8. For insulated pipes apply bands after insulation and painting work has been completed.
9. Colors shall conform to ASME Standard A13.1. Provide 24 additional bands of each type for future use by the City of New York's personnel.
10. Follow manufacturer's instructions for application procedures using non-combustible materials and contact adhesives.

- B. Equipment: Install engraved plastic laminate sign or equipment marker on or near each major item of mechanical equipment.

1. Lettering Size: Minimum 1/4-inch (6mm) -high lettering for name of unit where viewing distance is less than 2 feet (0.6 m), 1/2-inch (13mm) -high for distances up to 6 feet (1.8 m), and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.
2. Text of Signs: Provide text to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to name of identified unit.

- C. Duct Systems: Identify air supply, return, exhaust, intake, and relief ducts with duct markers; or provide stenciled signs and arrows, showing duct system service and direction of flow.

1. Location: In each space where ducts are exposed or concealed by removable ceiling system, locate signs near points where ducts enter into space and at maximum intervals of 50 feet (15 m).

- D. Adjusting: Relocate identifying devices which become visually blocked by work of this Division or other Divisions.

- E. Valves

1. Attach a 2" round brass tag stamped with designating numbers 1" high filled in with black enamel to each valve, except those on fixtures.
2. Securely fasten valve tag to valve spindle or handle with a brass chain.
3. Provide approved ceiling tile markers in areas where removable ceilings occur to indicate location of valves or other devices.

F. Motor Control Identification

1. Mount black lamacoid nameplates on each motor controller identifying primary control function and individual position indication such as Pump No. 1, etc. Nameplates shall be cut through to white background and have beveled edges. Mount with chromium plated acorn head screws.

G. Schedules and Charts

1. Furnish to the Commissioner three (3) complete framed plastic laminated valve tag schedules. Schedule shall indicate tag number, valve location by floor and nearest column number, valve size and service controlled.

3.5. PAINTING AND FINISHING

- A. Refer to Division 9 Section "Painting" for field painting requirements.
- B. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6. PANS AND DRAINS OVER ELECTRICAL EQUIPMENT

- A. This contractor shall examine the drawings and in cooperation with the Electrical Trade confirm the final location of all electrical equipment to be installed in the vicinity of piping. Plan and arrange all overhead piping no closer than four feet from a vertical line above electrical equipment, including but not limited to, elevator machine room equipment, main switchgear equipment, motor control centers, starter, electric motors, switchboards, panelboards, or similar equipment. Piping is not permitted in Electric Equipment, Transformer, Switch Gear, Elevator Equipment, Telephone Gear Rooms.
- B. Where the installation of piping does not comply with the requirements of the foregoing paragraph, where feasible the piping shall be relocated.
- C. Furnish gutters as follows:
  1. Provide and erect a gutter of 16 ounce cold rolled copper or 18 gauge galvanized steel, under every pipe which is within 4'-0" from a vertical line to any motor, electrical controllers, switchboards, panel-boards, or the like.
  2. Each gutter shall be reinforced, rimmed, soldered and made watertight, properly suspended and carefully pitched to a convenient point for draining. Provide a 3/4" drain, with valve as directed, to nearest floor drain or slop sink, as approved.
  3. In lieu of such separate gutters, a continuous protecting drain pan of similar construction adequately supported and braced, properly rimmed, pitched and drained to a floor drain or suitable waste, may be provided over any such electrical equipment, and extending 3'-0" in all directions beyond the electrical equipment, over which such piping has to run.

3.7. ERECTION OF METAL SUPPORTS AND ANCHORAGE

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.8. GROUTING

- A. Install nonmetallic nonshrink grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms for placement of grout, as required.
- D. Avoid air entrapment when placing grout.
- E. Place grout to completely fill equipment bases.
- F. Place grout on concrete bases to provide a smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout according to manufacturer's printed instructions.

### 3.9. WELDING

- A. Weld only by approved acetylene or electric welding process and welders shall hold certificate from approved insurance company.
- B. Conduct tests to demonstrate suitability of procedures to be used in making welds which conform to specified requirements.
- C. Specification for welding procedure shall meet requirements of Welding Qualifications, Section IX, ASME Boiler and Pressure Vessel Code and ANSI B31.1.
- D. Align components. No strain shall be placed on weld during welding. No part of pipe shall be offset more than 20% of thickness. Set flanges and branches properly.
- E. Welder qualification:
  - 1. Test welders to demonstrate ability to make acceptable welds. Tests conducted for qualification of welder for work under one Division or Section shall not qualify welder for work under another Division or Section.
  - 2. Tests shall be as prescribed for welder qualification in Section IX of the ASME Code.
  - 3. Records of such tests shall be as follows: Each welder shall be assigned an identifying number, letter or symbol. Identifying mark shall be stamped adjacent to welds made by this welder. Identification shall be at top of horizontal piping and at front of vertical piping.
  - 4. Maintain record of welders employed, showing dates and results of tests and identifying mark assigned to each welder. Certify records and make them accessible to the City of New York's project representative and/or project manager. Before completion of project, one copy of records shall be turned over to the City of New York.
  - 5. No qualification shall be older than three years when welder commences to work on this project. If the welder has not welded in required welding process for a period of six months, he shall be re-certified.
- F. Welding Tests
  - 1. As designated by Commissioner, remove welds for destructive testing or for testing by non-destructive means.
  - 2. If, in Commissioner's opinion, welds so tested do not meet requirements of Sections VIII and IX of ASME, then the contractor shall pay for costs of the tests. Remove welds

welded by that welder at no cost to the City of New York. Rewelding shall be performed by qualified welder other than welder whose weld did not pass the test. Welders whose welds were defective shall not be employed on site for remainder of the project.

3. Welding of stanchions, brackets, anchors and other welding not performed on pipe joints shall be in accordance with requirements of AWS specifications and requirements.

### 3.10. EXCAVATION AND BACKFILL

A. All excavation and backfill for HVAC work will be done by the HVAC Trade.

B. The work includes removal of surface improvements, excavating including hand excavation, sheeting, shoring, bracing, maintaining and protecting existing structures, utilities, pavements, shrubbery; dewatering by pumping of all water from excavation, bedding, backfilling, and compacting, restoration of surface improvements and cleaning up of the site.

C. Instructions:

1. Trenches shall be excavated so that pipe can be laid to the alignment and depth indicated on the drawings, and shall be excavated only so far in advance of pipe laying as approved.
2. Width of trenches shall be held to a minimum consistent with the type of material encountered and the size of piping being laid, but the width at the top of the pipe shall not be more than 2 feet plus outside diameter of pipe. Excavation for manholes and other accessories shall have 12 inch minimum and a 24 inch maximum clearance on all sides.
3. Before fill or backfilling commences, all trash, debris, and other foreign material shall be removed from trenches to be backfilled by this Trade. Fill material shall be free from timber, rocks 3" or larger, organic material, frozen material, and other unsuitable material as determined by the Commissioner. Filling shall not be done in freezing weather, unless specifically approved. No filling shall be done when material already in place is frozen.
4. In filling around pipe, deposit backfill material in successive horizontal layers not exceeding 6" in thickness before compaction. Compact each layer thoroughly by means of approved mechanical tampers. Tech special care to obtain compaction under pipe haunches. Deposit backfill adjacent to pipes on both sides to approximately same elevation at the same time. Continue this method of filling and compacting until backfill is at least 18" above top of pipe.
5. Backfilling for the remainder of pipe trenches to subgrades of paved or landscaped areas shall be done by mechanical tamping and rolling equipment, except that the use of such equipment is prohibited when said use may result in damage to pipelines or structures.
6. All copper tubing laid in ground shall be backfilled around and one (1) foot over with good clean earth, free from stone or cinders, carefully tamped under and around the tubing for its full length. The remainder of the backfill shall be free from stones larger than (3) inches in diameter and shall be satisfactorily compacted by puddling and tamping.
7. Backfill shall be moistened as necessary for proper compaction. Water settling of fill will not be permitted.
8. Complete backfilling of pipe trenches as soon as possible after the pipe is laid and tested.
9. Existing pavements, roadways, walkways, curbs and landscaped areas disturbed during the progress of the excavation and backfill work shall be restored to their original condition at no additional cost to the City of New York.
10. Backfill shall be compacted to a minimum of 90% of modified AASHO maximum density as defined by ASTM D-1557-. Any layer of fill, or portion thereof, which is not compacted to the required density shall be re-compacted until the specified density is achieved, or the layer shall be removed.

### 3.11. ACCESS AND ACCESS PANELS

- A. Access panels are generally not shown on the drawings, but they are required to be provided by the Contractor.
- B. Provide proper access to materials and equipment that require inspection, replacement, repair or service, and coordinate their delivery with the installing Trade. If proper access cannot be provided, confer with Commissioner as to the best method of approach for minimizing effect of reduced access which may result.
- C. Coordinate and prepare a location, size, and function schedule of access panels required to fully service equipment and deliver to a representative of installing Trade. Furnish and install distinctively colored buttons (color as selected by Commissioner) in finished ceiling to identify all access panels.
- D. Furnish access panels for installation under other Sections where fire dampers, volume dampers, controls, shut-off valves, control valves, check valves, or other items installed under this section require access and are concealed in floor, wall, furred space or above ceiling. Access panels shall be by Milcor, Knapp, Nystorm or Inlanf Steel; coordinate selection with other Section supplying similar access panels
- E. Ceilings consisting of lay-in or removable splined tiles do not require access panels and dampers, splitters, or test hole openings above ceiling shall have location marked with thumb tack on finished ceiling panel. Location shall be noted on record drawings.
- F. Access panels shall have same fire rating classification as surface penetrated
- G. Panels shall be at least 12"x12"; access panels at equipment (VAV boxes, fan boxes and others) shall be 18"x18".

### 3.12. PENETRATIONS AND SLEEVES

#### A. General

- 1. Layout penetration and sleeve openings in advance, to permit provision in work. Set sleeves and conduit in forms before concrete is poured. Provide remedial work where sleeves and conduits are omitted or improperly placed.
- 2. Provide sleeves and packing materials at all penetrations of foundations, walls, slabs (except on grade), partitions and floors. Sleeves shall meet NFPA 101 requirements and material requirements of these specifications.
- 3. Sleeves that penetrate outside walls, basement slabs, footings and beams shall be waterproof.
- 4. Coordinate work carefully with architectural and structural. Set sleeves in forms before concrete is poured. Provide core drilling as necessary if walls are poured, or otherwise constructed, without sleeves and a wall penetration is required. Provide core drilling as required for penetration of existing construction. Do not penetrate structural members without Commissioner's approval.
- 5. Sleeves for insulated pipe and duct in no-fire rated construction shall accommodate continuous insulation without compression. Sleeves and/or penetration in fire rated construction shall be packed with fire rated material which shall maintain the fire rating of the wall. Seal ends of penetrations to provide continuous vapor barrier where insulation is interrupted.
- 6. Where pipes, etc. passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling, and wall finishes.
- 7. Identify unused sleeves and slots for future installation.
- 8. Fill slots, sleeves and other openings in floors and walls not used. Fill spaces in openings after installation of pipe, duct, conduit or cable.

9. Fill for floor penetration shall prevent passage of water, smoke, fire, and fumes. Fill shall be fire resistant in fire floors and walls, and shall prevent passage of air, smoke and fumes.
10. Sleeves through floors shall be watertight and shall extend 2" above floor surface.
11. Pipe and Conduit Sleeves:
12. Annular space between pipe/conduit and sleeve shall be at least 1/4".
13. Sleeves are not required for slabs-on-grade unless specified otherwise.
14. Sleeves and packing materials, through rated firewalls and smoke partitions shall maintain fire rating of construction penetrated.
15. Do not support piping risers or conduit on sleeves.
16. Duct Sleeves and Prepared Openings:
17. Provide duct sleeves for round ducts 15" and smaller; provide prepared, framed openings for round ducts larger and for square, rectangular and flat oval ducts, except as otherwise specified otherwise. Sleeves shall meet SMACNA requirements.
18. Provide sleeves for ducts through 1-, 2- Or 3- hour fire rated construction and smoke partitions, regardless of size or shape of ducts. Sleeves shall maintain fire rating of construction penetrated. Sleeve and seal materials, construction and clearances shall meet requirements of SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems.
19. Prepared openings shall be framed to provide 1" clearance between framing and duct or duct insulation.
20. Installations, Testing and Approvals:
21. Installation shall meet manufacturer's recommendations exactly, particularly regards to safety, ventilation, removal of foreign materials and other details of installation. Dam openings as recommended. Remove flammable materials used for damming and forming seals in fire rated construction.
22. Sleeve penetration methods shall be water- and gas- tight and shall meet requirements of ASTM 119 Standard Methods of Fire Tests of Building Construction and Materials.
23. Fire-stop penetration seal methods and materials shall be FM-approved and UL-listed as applicable. They shall have same rating as the structure penetrated. Submit manufacturer's detail sheet indicating assembly rating.
24. Inspect foamed sealants to ensure manufacturer's optimum cell structure and color ranges.

### 3.13. ELECTRICAL REQUIREMENTS:

- A. Electrical Work in this Division shall conform to requirements of Division 16.
- B. This Contractor shall furnish all motors, starters, variable frequency drives, disconnects for motors and heating coils and controls for equipment under his Contract, unless otherwise noted.
- C. Division 16 Contractor shall install all starters, variable frequency drives, disconnects and overload protectors furnished by this Contractor and shall provide all necessary wire, conduit and boxes to properly connect equipment for this Contractor no matter how many disconnects, starters, etc are included, unless otherwise noted. Electrical Contractor shall receive, unload, set and install motor starters, disconnects and other items to be installed under Division 16.
- D. This Contractor shall provide all necessary conduit and control wiring to pushbuttons, thermostats, pilot lights, interlocks and similar equipment for equipment under this Division.
- E. Flow control switches, thermostats, controllers, relays, transformers, switches, etc and other components provided with equipment shown on the Contract Documents not to be factory wired or part of division 17 scope necessary for proper operation of mechanical systems shall be furnished and installed by this Contractor.

- F. Where the starter and/or safety switch is an integral part of equipment assembly, the assembly shall be furnished with the wiring complete between starter, controller and motor. The Electrical Contractor will make connections to unit terminals.
- G. Factory wired assemblies and panels: Pre-wired to numbered terminal strips for connection to field wiring. Provide disconnect switch for each control circuit connection to pre-wired assemblies and control panels.
- H. All motor control centers (MCCs) shall be provided and installed by the electrical contractor. If the Electrical Contractor is providing MCCs for specific motors, the Mechanical Contractor shall not furnish starter for those specific motors. However the Mechanical Contractor shall coordinate with Electrical Contractor the starter requirements to insure proper operation of those motors.
- I. All motors and motor control equipment shall meet the requirements of NEC, and shall comply with requirements of the Public Utility Company furnishing service and with rules and regulations of all authorities having jurisdiction.
- J. THIS CONTRACTOR SHALL VERIFY VOLTAGE AT SITE BEFORE ORDERING ANY ELECTRICAL EQUIPMENT.
- K. Wiring:
  - 1. Power wiring: Except for factory wiring on mechanical equipment, power wiring is specified in Division 16.
  - 2. HVAC control wiring:
    - a. Except for factory wiring on mechanical equipment. Control wiring will be done by control contractor or through control Contractor.
    - b. All wiring and conduit shall be according to latest edition of the NEC. All control wiring shall be installed in EMT in accordance with applicable portions of NEC and requirements of Division 16.
    - c. Low voltage wiring in air plenums shall be UL approved conductor for application as manufactured by Alpha or Beldon.
  - 3. Fire protection system wiring: See Division 16.
  - 4. Provide electrical contractor approved wiring diagrams for work to be connected under Division 16.
- L. Provide weatherproof devices and installation for out-of-doors work.
- M. Smoke detectors: Product of combustion detectors in ductwork furnished under Division 16, installed by this Division 23000, and wired by Division 16 to fire alarm system.
- N. Motors:
  - 1. Provide motors for equipment specified. Separately shipped motors are to be installed by Division 23000. Coordinate with Division 16.
  - 2. Separately shipped motors and variable frequency drives shall be received unloaded installed by Division 23000, wired by Division 16. Adjustable motor bases and all bolts and nuts required for installation of base and motor shall be provided and installed by Division 23000.
  - 3. Align and adjust mechanical coupling for direct-driven motorized equipment. Adjust and align drive and belt tension on belt-driven equipment.
  - 4. Field lubricate all motors prior to operation and maintain lubrication prior to acceptance of equipment by the City of New York.

5. Provide to electrical contractor motor terminal connection diagram as prepared by motor manufacturers.
6. The Electrical Contractor shall be responsible for proper rotation of three phase equipment.

O. Power Factor Correction:

1. This Contractor shall be responsible for all equipment, labor, coordination and all other related appurtenances required for the installation of power correction devices at all equipment supplied under this contract. Equipment requiring power correction devices shall be furnished and installed with the same as hereinafter specified. Power factor correction devices (including means and methods) shall be included as part of their respective equipment submittal, materials, wiring diagrams, shop drawings, and catalog cuts for review by the Commissioner.
2. Devices shall be furnished and installed to ensure a minimum power factor of over 90% over the full operating range of the equipment. Equipment requiring power factor correction devices are:
  - a. Air Handling Units
  - b. Condensing Units
  - c. All three-phase mechanical exhausters and fans of any type.
  - d. Pumps

3.14. EXPANSION PROVISIONS

- A. Installation of piping must allow for expansion using offsets, loops, swing joints, expansion joints, etc. as necessary to prevent undue strain. Take-offs from mains to runouts shall not have less than three elbow swing.
- B. Mains and risers with loops or offsets shall be securely anchored to structure so as to impart expansion towards loops or offsets. Anchors shall be constructed of heavy forged wrought iron, secured to pipe and to structure. Provide vibration isolation as required.
- C. Provide pipe alignment guides as required to guide expanding pipe to move freely from anchor points toward expansion joints, offsets, etc.

3.15. CLEANING

- A. Cleaning shall be performed prior to commissioning.
- B. Completely cover all plumbing fixtures and all motors and other moving machinery to prevent entry of dirt and water during construction. Effectively cap all openings into ducts and pipes to keep foreign matter out during construction.
- C. Protect all finished surfaces of fixtures with heavy paper pasted thereon, or by other means, throughout the period of construction.
- D. Ductwork:
  1. Ducts shall be thoroughly cleaned so that no dirt or dust shall be discharged from diffusers, registers or grilles, when system is operated.
  2. Provide temporary connections for cleaning. Provide cheesecloth for openings during cleaning.
  3. Replace filters prior to final inspection and testing.

E. Piping

1. Furnish pipe cleaning chemicals, chemical feed equipment, materials and labor necessary to clean pipe.
2. Permanently install necessary chemical injection fittings complete with stop valves.
3. After all piping systems have been pressure tested and approved for tightness, clean and flush piping as specified and as required by codes.
4. Maintain continuous blowdown and make-up, as required during flushing operation.

F. Equipment

1. After completion of project, clean exterior surface of all equipment, including concrete residue, dirt, paint residue, etc.
2. Plumbing fixtures - clean and polish fixtures immediately prior to final inspection.

END OF SECTION 230110

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## SECTION 230120

### SEISMIC

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. This Section includes general and procedural requirements for the design of seismic control for mechanical components and installations.
- B. For all items that are required to have seismic supports or restraints, seismic plans and seismic restraint calculations shall be prepared, sealed, and submitted by a professional engineer licensed in the State of New York engaged by the Contractor. The Contractor's registered professional engineer shall provide installation supervision of all seismic supports and restraints. The contractor's registered professional engineer shall submit signed and sealed affidavit stating that the installation is in full compliance with the signed/sealed shop drawings. Vibration control shall apply as specified under another section of this work.
- C. Seismic bracing and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.
- D. It is the intent of the Section of the specification to keep all mechanical, electrical, plumbing and fire protection building system components in place and operational during a seismic event.
  - 1. It shall be understood that the requirements of this seismic section are complementary to requirements delineated elsewhere for the support, fastening and isolating of equipment, ductwork and piping work. Nothing on the drawings or specifications shall be interpreted as a reason to waive the requirements of this seismic section.
- E. All such systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a conflict occurs between the manufacturers or construction standards, the most stringent shall apply.
- F. This specification is considered to be minimum requirements for seismic consideration.
- G. This project requires compliance with New York City Building Code. Seismic restraints shall be applied in accordance with the following site and use classifications.
  - 1. Use Group; 2
  - 2. Seismic Design Category B
  - 3. Importance factor ; 1.00
- H. As part of the work, this trade shall engage the services of an independent Professional Engineer Licensed in the state of New York, with experience in the field of equipment support and seismic restraints.
- I. This work shall be coordinated with the vibration isolation requirements as specified under another section of the work.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 230110 - Basic Materials, Methods and Requirements (Mechanical).
- C. Section 230548 Foundation and Vibration Isolation (Seismic).
- D. This section is a part of Each Division 230000 Section.

1.3 APPLICABLE PUBLICATIONS CODES AND STANDARDS

- A. International Building Code
- B. International Mechanical Code
- C. International Plumbing Code
- D. NFPA 70 (2002) - National Electric Code
- E. International Energy Conservation Code
- F. SMACNA Guidelines for Seismic Restraint of Mechanical Systems
- G. NFPA 13 and 14 for Fire Protection System (Standard)
- H. American National Standard Institute (ANSI):
- I. Air Moving and Conditioning Association (AMCA):
- J. American Society of Mechanical Engineers (ASME):
- K. American Society for Testing and Materials (ASTM):
- L. National Fire Protection Association (NFPA)
- M. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).
- N. Occupational Safety and Health Administration (OSHA).
- O. Underwriters Laboratories (UL).

1.4 DEFINITIONS

- A. Life Safety Systems:
  - 1. All systems involved with fire protection including fire dampers and smoke exhaust systems.
  - 2. All mechanical systems that support the operation of or are connected to emergency power equipment including all lighting, generator, transfer switches and transformers.
  - 3. Automated supply, exhaust, fresh air and relief air systems on emergency control sequence including air handlers, ducts, dampers, etc.

- B. Anchor: A device, such as an expansion bolt, for connecting duct or pipe bracing members into the structure of a building.
- C. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved.
- D. Attachments, Seismic: Means by which components and their supports are secured or connected to the seismic-force-resisting system of the structure. Such attachments include anchor bolts, welded connections and mechanical fasteners.
- E. Bracing: Metal channels, cable or hanger angles that prevent ducts and pipe from breaking away from the structure during an earthquake. See also Longitudinal Bracing and Transverse Bracing. Together, they resist lateral loads from any direction.
- F. Certificate of Compliance: A certification stating that materials and products meet specified standards or that work was done in compliance with approved construction documents.
- G. Component: A part or element of an architect and electrical, mechanical, or structural system.
- H. Component, equipment: A mechanical or electrical components or element that is part of a mechanical and/or electrical system within or without a building system.
- I. Dynamic properties or piping: The tendency of pipe to change in weight and size because of the movement and temperature of fluids in them. This does not refer to movement due to seismic forces.
- J. Equipment: Systems associated with ducts, pipe and conduit.
- K. Gas pipes: Is any pipe that carries fuel gas or compressed air.
- L. Hazardous Contents: A material that is highly toxic or potentially explosive and in sufficient quantity to pose a significant life-safety threat to the general public if an uncontrolled release were to occur.
- M. Inspection Certificate: An identification applied on a product by an approved agency containing the name of the manufacturer, the function and performance characteristics, and the name and identification of an approved agency that indicates that the product or material has been inspected and evaluated by an approved agency.
- N. Isolation System: The collection of structural elements that includes individual isolator units, structural elements that transfer force between elements of the isolation system and connections to other structural elements.
- O. Label: An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the same and identification of an approved agency and that indicated that the representative sample of the product or materials has been tested and evaluated by an approved agency.
- P. Lateral Forces: A force acting on a duct or pipe in the horizontal plane. This force can be in any direction.
- Q. Licensed Professional Engineer: An independent, qualified, licensed Professional Engineer having PE registration from the same state as the project, with significant experience in the field of seismic design, equipment support and seismic restraints.

- R. Longitudinal Bracing: Bracing that prevents a duct or pipe from moving in the direction of its run.
- S. Longitudinal Force: A lateral force that happens to be in the same direction as the duct or pipe.
- T. Manufacturer's Designation: identification applied on a product by the manufacturer indicating that a product or material complies with a specified standard or set of rules.
- U. Occupancy Importance Factor: A factor assigned to each structure according to its Seismic Use Group as prescribed in IBC Chapter 16.
- V. Positive Attachment: A mechanical device designed to resist seismic forces that connected a non-structural element, such as a duct, to a structural element, such as a beam. Bolts and screws are examples of positive attachments. Glue and friction due to gravity do not create positive attachments.
- W. Seismic Design Category: A classification assigned to a structure based on its Seismic Use Group and the severity of the design earthquake ground motion at the site.
- X. Seismic Force: The assumed forces prescribed herein, related to the response of the structure to earthquake motions, to be used on the design of the structure and its components.
- Y. Seismic Use Group: A classification assigned to a building based on its use as defined in IBC Chapter 16.
- Z. Seismic: Related to an earthquake. Seismic loads on a structure are caused by wave movements in the earth during an earthquake.
  - 1. Site Class: A classification assigned to a site based on the types of soils present and their engineering properties as defined in IBC Chapter 16.
  - 2. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.
  - 3. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.
  - 4. Special Inspection: Inspection as herein required of the materials, installation, fabrication, erection or placement of components and connections requiring special documents and referenced standards.
  - 5. Transverse bracing: Bracing that prevents a duct or pipe from moving from side to side.

#### 1.5 SUBMITTALS

- A. General: Submit the following according to the General Conditions and amendments thereto.
- B. Prior to purchasing any equipment or materials, a list of their manufacturers shall be submitted for review.
- C. Shop Drawings:
  - 1. Drawings showing equipment base constructions including dimensions, structural member sizes and support point locations.
  - 2. Drawings showing details of suspension and support for ceiling hung equipment.
  - 3. Drawings showing methods for isolation of pipes and ductwork piercing walls and slabs.
  - 4. Concrete and steel details for bases, including anchor bolt locations.

5. Number, location and details of seismic restraints and anchors for each piece of equipment and of ductwork and piping.
  6. Specific details of restraints, including anchor bolts for mounting and maximum loading at each location for each piece of equipment and lengths of ductwork and piping.
- D. Where walls, floors, slabs or supplementary steel work are used for seismic restraint locations, details of acceptable attachment methods for ducts and pipe must be included and approved before the condition is accepted for installation. Restraint manufacturers' submittals must include spacing, static loads and seismic loads at all attachment and support points.
- E. Provide Approved Agencies Certificate of Compliance showing compliance with sections 16 and 17 of the IBC for all components. Tests shall include anchorage, structural and on line capability from analytical or shaker test method.
1. Where the requirements of this specification cannot be met by any vendor, the contractor will submit a written summary indicating the lack of resources clearly indicating that none of the specified, listed or other vendors known to the contractors meet the compliance, testing and certification portions of the IBC specifications Sections 16 and 17. Special inspections shall still be conducted even if no vendors meet the requirements.
- F. The submittal material shall also include copies of descriptive data for all products and materials including, but not limited to, the following:
1. Descriptive Data:
    - a. Catalog cuts and data sheets on specific vibration isolators and seismic restraints to be utilized showing compliance with the specifications.
    - b. An itemized list showing the items of equipment or piping to be isolated, the isolator type and model number selected, isolator loading and deflection, and reference to specific drawings showing seismic restraints, base and construction where applicable.
    - c. An itemized list of non isolated equipment, piping, and ductwork to be seismically restrained.
    - d. Seismic restraint calculations.
    - e. Seismic restraints for isolated equipment.
    - f. Seismic restraints for non-isolated equipment.
    - g. Certification of seismic restraint designs and installation supervision.
    - h. Certification of seismic attachment of housekeeping pads.
    - i. All equipment (components) requiring IBC certification.
- G. Drawings and calculations (by the licensed professional engineer) substantiating the mounting system, the number and location of seismic restraints and specified details of restraints including anchor bolts for mountings and maximum load (static plus dynamic) expected at each restraint or snubbing device including fastening devices for the seismic restraints which are capable of maintaining equipment, piping or ductwork in a captive position. Restraint devices shall be designed and selected to meet seismic requirements, as defined in the latest IBC.
- H. Documents will not be accepted for review unless:
1. They include complete information pertaining to appurtenances and accessories.
  2. They are submitted as a package where they pertain to related items.
  3. They are properly marked with service or function, project name, where they consist of catalog sheets displaying other items which are not applicable.
  4. They indicate the project name and address along with the Contractor's name, address and phone number.

5. They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.
- I. All documents shall be stamped, sealed and signed by the registered Professional Engineer having a PE from the same state as the project, whose services were engaged by this trade contractor.

#### 1.6 QUALITY ASSURANCE

- A. Seismic restraints shall be provided by a company specializing in vibration isolation and seismic restraints with five years minimum experience.
- B. Testing or calculating (including the combining of tensile and shear loadings) to support seismic restraint designed must be stamped by the licensed Professional Engineer. Testing and calculations must include shear and tensile loads as well as one test or analysis at 45 degrees to the weakest mode.
- C. Component testing must be by an approved agency.
- D. Analysis for anchorage must indicate calculated dead loads, static seismic loads and capacity of materials utilized for connections to equipment and structure. Analysis must detail anchoring methods, bolt diameter, embedment and/or welded length. All seismic restraint devices shall be designed to accept, without failure, the forces acting through the equipment center of gravity. Overtuning moments may exceed forces at ground level.
- E. Internally isolated equipment in lieu of specified isolation and restraint systems must meet the specified isolation and system restraint criteria.
- F. A seismic design Errors and Omissions insurance certificate MUST accompany the equipment manufacturer's certification. Product liability insurance certificates are not acceptable.
- G. In the event that the equipment is internally isolated and restrained, the entire unit assembly must be seismically attached to the structure. Curb or roof rail mounted equipment must not only have seismic attachment of the equipment must not only have seismic attachment of the equipment to the roof but also to the curb or rails. The attachment and certification thereof shall be by this section.

#### 1.7 DESCRIPTION

- A. All rigidly or resiliently installed equipment, piping, etc., shall be capable of withstanding the seismic forces to which it might be subjected without permanent displacement of the equipment from the installed position.
- B. See Hangers, Supports, Anchors and Guides (Seismic Design)
- C. See Foundations, Vibration Isolation, and Supports for Rigidly Supported Equipment (Seismic Design).
- D. Housekeeping pads shall be sized to have a minimum of 6 inches of clearance all around the equipment or 12 bolt diameters, whichever is greater.
- E. All components shall be positively attached to the building structure and be approved by the structural engineer. Positive attachment is defined as a cast-in anchor, a drill-in wedge anchor, a double-sided beam clamp loaded perpendicular to a beam, or a welded or bolted connection

to structure. Single sided "C" type beam clamps for support rods of overhead piping, ductwork, fire protection or any other equipment are not acceptable on this project as seismic bracing points.

1. Chimneys and stacks passing through floors are to be bolted at each floor level or secured above and below each floor with riser clamps or approved vibration isolation systems with seismic restraints.
2. Chimneys and stacks running horizontally to be braced every 30 ft (9 m) with Type III restraining system.

F. Design Loads:

1. Actual loads shall be calculated but shall not be less than the minimum force and acceleration loads required for the specific category of the project for static mounted components including internal components as part of a manufactured system.

G. Manufacturer Responsibilities

1. Manufacturer of vibration isolation and seismic restraint equipment shall have the following responsibilities. As part of this work, the manufacturer shall engage the services of a licensed Professional Engineer, who shall have the following responsibilities.
  - a. Design the vibration isolation and seismic restraint sizes and locations.
  - b. Provide piping and equipment isolation systems and seismic restraints as to meet the requirements as specified herein.
  - c. Guarantee specified isolation system deflection.
  - d. Provide installation instructions, drawings and field supervision to assure proper installation and performance.
  - e. Provide certification that the installation of all mounts and restraints meet the project requirements for seismic loading.
2. Substitution of internally isolated mechanical equipment in lieu of the specified isolation of this Section must be approved for individual equipment units and is acceptable only if above acceleration loads are certified in writing by the equipment manufacturer and stamped and sealed by a licensed civil or structural engineer.
3. All manufacturers providing equipment and/or vibration/seismic control systems must provide a Seismic Design Error and Omissions Insurance Certificate for their firm or their design consultant to certify their ability to provide engineering and design as required by this section.
4. All manufacturer's including Original Equipment Manufacturers (OEM) are responsible for Seismic Certification and Analysis.

H. Contractor Responsibilities

1. The Contractor performing the work on equipment and systems in this section of work shall have the following responsibilities.
2. As part of the work, this contractor shall engage the services of a licensed professional engineer and shall have the following responsibilities.
  - a. He shall select and coordinate the restraints and supports based on the final coordinated drawings showing exact location of piping and equipment and shall coordinate with the project structural engineer to ascertain that the connections to the structure will resist the seismic forces to which they might be subjected.
  - b. Coordinate the restraints and supports based on the final coordinated drawings showing exact location of piping and equipment and shall coordinate with the

- project structural engineer to ascertain that the connections to the structure will resist the seismic forces to which they might be subjected.
- c. Participate in the preparation of Coordination Drawings (as specified under another section of this work) to show space requirements for the seismic restraints and supports for the piping, ductwork and equipment.
  - d. Based on the final coordinated drawings showing exact locations of piping, equipment and ductwork, he shall select and coordinate the restraints and supports.
  - e. Be responsible for the performance of all special inspections as required by the IBC, and all other agencies having jurisdiction.
  - f. Identify the components that are part of the Quality Assurance Plan. 1) All electrical components for standby or emergency power systems. 2) All flammable, combustible and highly toxic piping and their associated mechanical systems.
3. All ductwork containing hazardous materials. 4) All equipment using combustible or toxic energy sources.
    - a. Identify all Special inspection and Testing.
    - b. List control procedures within the contractor's organization including methods and frequency of reporting and their distribution.
    - c. List personnel and their qualifications exercising control over the seismic aspects of the project.
  4. This work shall be coordinated with the vibration isolation requirements as specified under another section of the work.
  5. Be responsible for the continuous inspections and periodic inspections as required by the IBC and all other agencies having jurisdiction.
  6. Purchased and/or fabricated equipment must be designed to safely accept external forces of load in any direction for all rigidly and resiliently supported equipment, piping and ductwork without failure and permanent displacement of the equipment. Life safety equipment such as fire pumps, smoke exhaust fans, emergency generators and other life safety designated equipment must be capable of accepting external forces (as required by the specific design category for the project) in any direction without permanent displacement or failure of the equipment.

## PART 2 - PRODUCTS ( Non Applicable )

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturer's written instructions and all certified submittal data.
- B. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or ductwork resulting in stresses or misalignment.
- C. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system specified, under another section of the work.

- D. The contractor shall not install any isolated equipment, piping or duct, which makes rigid connections with the building. "Building" includes, but is not limited to, slabs, beams, columns, studs and walls.
- E. Coordinate work with other trades to avoid rigid contact with the building.
- F. Vibration isolation manufacturer shall furnish integral structural steel bases as required. Independent steel rails are not permitted.
- G. Where piping passes through walls, floors or ceilings, the contractor shall provide wall seals or resilient packed pipe sleeves.
- H. Air handling equipment and centrifugal fans shall be protected against excessive displacement which results from high air thrust in relation to the equipment weight. Horizontal thrust restraints shall be those described in the specification when horizontal motion exceeds 3/8 inches.
- I. Special and Periodic Inspections shall be conducted and submitted on a timely basis.

### 3.2 EQUIPMENT RESTRAINTS

- A. Equipment shall be isolated and restrained.
- B. Place floor mounted on 4 inches high concrete housekeeping pads properly doweled or expansion shielded to the deck to meet acceleration criteria. Anchor isolators and/or bases to housekeeping pads.
- C. Ceilings containing diffusers must meet seismic zone requirements by using earthquake clips or other approved means of positive attachment to secure diffuser to T-bar structure.
- D. Additional Requirements
  - 1. The minimum operating clearance under all isolated components bases shall be 2 inches.
  - 2. All floor or wall mounted equipment and tanks shall be restrained.

### 3.3 PIPING AND DUCTWORK RESTRAINTS

- A. Seismic Restraint of Piping.
  - 1. All high hazard and life safety pipe regardless of size such as fuel oil piping, fire protection mains, gas piping and compressed air piping shall be seismically restrained. There are no exclusions for size or distance in this category.
  - 2. Seismically restrain all piping located in boiler rooms mechanical equipment rooms and refrigeration equipment rooms that is 1-1/4 inches I.D. and larger.
  - 3. Seismically restrain all other piping 2-1/2 inches diameter and larger.
  - 4. Multiple runs of pipe on the same support shall have distance determined by calculation.
  - 5. Rod braces shall be used for all rod lengths greater than 3 inches.
  - 6. Clevis hangers shall have spacers placed inside of hanger at seismic brace locations.
  - 7. Where thermal expansion is a consideration, guides and anchors may be used as transverse and longitudinal restraints provided they have a capacity equal to or greater than the restraint loads in addition to the loads induced by expansion or contraction.

8. For fuel oil and gas piping, transverse restraints must be at 20' maximum and longitudinal restraints at 40' maximum spacing.
9. Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24 inches of the elbow or TEE or combined stresses are within allowable limits at longer distances.
10. Hold down clamps must be used to attach pipe to all trapeze members before applying restraints.
11. Branch lines may not be used to restrain main lines.
12. All PVC and glass pipe less than 6 inches are braced only if the pipe use involves hazardous or toxic materials. All other PVC and glass pipe greater than 6 inches shall be braced at 20' transversely and 40' longitudinally with bottom shields.

B. Seismic Restraint of Ductwork

1. Restrain rectangular ductwork with cross sectional area of 6 square feet or larger. All ductwork which serves a life safety function (smoke evacuation duct or fresh air make up connected to emergency system, emergency generator exhaust, boiler breeching) or carries toxic materials or must be braced.
2. Restrain round ducts with diameters of 28 inches or larger.
3. Restrain flat oval ducts the same as rectangular ducts of the same nominal size.
4. The ductwork must be reinforced at the restraint locations. Reinforcement shall consist of an additional angle on top of the ductwork that is attached to the support hanger rods. Ductwork is to be attached to both upper angle and lower trapeze.
5. A group of ducts may be combined in a larger frame so that the combined weights and dimensions of the ducts are less than or equal to the maximum weight and dimensions of the duct for which bracing details are selected.
6. Walls, including gypsum board non-bearing partitions, which have ducts running through them, may replace a typical transverse brace. Provide channel framing around ducts and solid blocking between the duct and frame.

3.4 INSPECTION

- A. On completion of installation of all vibration isolation and seismic restraint devices herein specified, the local representative of the isolation materials manufacturer shall inspect the completed system and report in writing any installation errors, improperly selected isolation or restraint devices, or other faults that could affect the performance of the system. Contractor shall submit a report to the Commissioner, including the manufacturer's representative's final report, indicating all isolation reported as properly installed or requiring correction, and include a report by the Contractor on steps taken to properly complete the isolation work.
- B. All special inspections on components required to be seismically restrained must be performed in accordance with IBC and as specified herein.
  1. The professional engineer engaged by the contractor shall be responsible for the performance of all special inspection.
- C. Continuous inspection: The full-time observation of work by an approved special inspector pursuant to IBC section 1704. The following pieces of equipment require these inspections:
  1. All equipment using combustible energy sources.
  2. All electric motors, transformers, switchgear unit substations and motor control centers.
  3. Reciprocating and rotating type machinery.

4. Pipe, 3 inches & larger.
5. Tanks, heat exchangers & pressure vessels.

D. Periodic inspection: intermittent observation of work by an approved special inspector of the following pieces of equipment in compliance with IBC section 1704.

1. All smoke control systems during construction & prior to concealment for leakage testing.
2. All smoke control systems prior to occupancy for pressure differential testing.
3. Isolator units for seismic isolation system.
4. All flammable, combustibile piping and their associated mechanical systems.

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## SECTION 230500

### COMMON PIPING FOR HVAC

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. HVAC demolition.
9. Equipment installation requirements common to equipment sections.
10. Painting and finishing.
11. Supports and anchorages.

##### 1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
  1. CPVC: Chlorinated polyvinyl chloride plastic.
  2. PE: Polyethylene plastic.
  3. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

#### 1.4 SUBMITTALS

- A. Product Data: For the following:
  1. Transition fittings.
  2. Dielectric fittings.
  3. Mechanical sleeve seals.
  4. Escutcheons.
- B. Welding certificates to the General Contractor for record.
- C. Provide full coordinated Piping layout in coordination with other trades.

#### 1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
  1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
  2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

#### 1.7 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
  2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

**2.2 PIPE, TUBE, AND FITTINGS**

SERVICE	SIZE	PIPE	FITTINGS
Chilled, hot water, dual temp., and secondary water (up to 300 psi) - mains, risers, vents and reliefs	3" and under	Schedule 40 ASTM-A53, Grade B, Seamless or ERW Hard Copper Type K-ASTM -B-88	150 psi and under, malleable iron 150 lb., screwed 151 psi to 300 psi: Malleable iron 300 lb. screwed Copper line; Braze or Solder
Drain Pan Piping , Condensate drain line,	4" and under	Copper Type L hard drawn	Wrought or copper with lead free 95/5 solder or brazed
OPTION Closed chilled water and condenser water branch piping.	3" and under	Copper Type L, hard drawn	Wrought or copper, brazed (B-CUP-5)

- A. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

**2.3 JOINING MATERIALS**

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

#### 2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

##### 1. Manufacturers:

- a. Capitol Manufacturing Co.
- b. Epco Sales, Inc.
- c. Hart Industries, International, Inc.
- d. Watts Industries, Inc.; Water Products Div.
- e. Zurn Industries, Inc.; Wilkins Div.

- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 minimum working pressure as required to suit system pressures.

##### 1. Manufacturers:

- a. Capitol Manufacturing Co.
- b. Central Plastics Company.
- c. Epco Sales, Inc.
- d. Watts Industries, Inc.; Water Products Div.

#### 2.5 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

##### 1. Manufacturers:

- a. Advance Products & Systems, Inc.
- b. Calpico, Inc.
- c. Metraflex Co.
- d. Pipeline Seal and Insulator, Inc.

- 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- 3. Pressure Plates: Carbon steel. Include two for each sealing element.
- 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.6 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

## 2.7 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
  - 1. Finish: Polished chrome-plated
- C. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

## 2.8 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.
  - 3. Packaging: Premixed and factory packaged.

## 2.9 PREINSULATED PIPING

- A. Provide pre-insulated piping by Nova, Ricwil or Perma-Pipe for underground (hot, chilled) water, steam condensate service with thermosetting fibrous glass reinforced plastic FRP outer casing, glass foam insulation as specified in specification section 15250 and carrier pipe for applicable service as specified in tables above.
- B. Pipe shall be straight 40 ft. straight sections without fittings.
- C. Installation and testing of all components of underground piping shall be in strict accordance with manufacturer's recommended practice. Give the Commissioner 5 business day notice prior to commencing installation of piping. A field Commissioner employed by the piping system manufacturer shall be on site during the entire time that the installation takes place. At the completion of installation, the manufacturer of the piping system shall deliver a letter to the Commissioner, stating that the piping system has been installed in accordance with manufacturer's directions, and that a factory employed Commissioner was on site during the

entire time that the installation and testing took place, and that the installation and testing conforms to recommended practice. The installing contractor shall also deliver a letter to the Commissioner, stating that the piping system has been installed in accordance with instructions of the manufacturer. The officer of the respective company shall sign both letters.

- D. Provide structural insulating cement support guides on 10 ft. centers. Guides shall be 1' wide and same diameter as pipe. Install as recommended by manufacturer.
- E. Provide oval, prefabricated expansion ells with oval support guides incorporated in ells.
- F. Provide steel plate anchors welded to carrier pipe and bonded to FRP casing. Plate shall be 1/8" thick for pipe sizes through 6", 1/2" thick for 8" through 16" pipe and 3/4" thick for 18" through 30" pipe. Provide holes in anchors between carrier and casing, for drain and vent. Pour concrete thrust blocks at anchors as recommended by manufacturer.
- G. Provide compressible silicon rubber, adjustable gland seals between carrier and casing, suitable for 450°F. Provide 1/2" NPS vent and drain connections on vertical centerlines of casing where pipe terminates inside building or manhole wall, at least 3" inside wall.
- H. Provide FRP leak plate fusion welded to casing, protruding 3" beyond outside casing diameter, where pipe penetrates building wall, as close as possible to center of wall.
- I. Provide polyester resin end seals welded to outside casing and bonded to carrier to seal insulation terminations.
- J. Provide steel head plates welded to carrier pipe and to steel sleeve of same size as the casing, at anchors within 5 ft. of piping terminal ends. Casing shall be wound on and bonded to steel sleeve. Weld drain and vent connections to sleeve.

### PART 3 - EXECUTION

#### 3.1 HVAC DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
  - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
  - 3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
  - 4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
  - 5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  - 6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  - 7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to City of New York.

- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

### 3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
  - 1. New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
    - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting, cast-brass type with polished chrome-plated finish.
    - g. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-plate, and set screw.
    - h. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
    - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
    - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
    - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
      - 1) Seal space outside of sleeve fittings with grout.
  4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
  2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
  3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- O. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- Q. Verify final equipment locations for roughing-in.

- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### 3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

### 3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
  - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
  - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.6 PAINTING

- A. Painting of HVAC systems, equipment, and components is specified in Division 23 Sections 230110 as well as Division 09 "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

END OF SECTION 230500

## SECTION 230513

### COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT MOTORS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes basic requirements for factory- and field-installed motors.

##### 1.3 DEFINITIONS

- A. **Factory-Installed Motor:** A motor installed by motorized-equipment manufacturer as a component of equipment.
- B. **Field-Installed Motor:** A motor installed at Project site and not factory installed as an integral component of motorized equipment.

##### 1.4 SUBMITTALS

- A. **Product Data for Field-Installed Motors:** For each type and size of motor, provide nameplate data and ratings; shipping, installed, and operating weights; enclosure type and mounting arrangements; size, type, and location of winding terminations; conduit entry and ground lug locations; and information on coatings or finishes.
- B. **Shop Drawings for Field-Installed Motors:** Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Include the following:
  - 1. Each installed unit's type and details.
  - 2. Nameplate legends.
  - 3. Diagrams of power, signal, and control wiring. Provide schematic wiring diagram for each type of motor and for each control scheme.
- C. **Coordination Drawings:** Floor plans showing dimensioned layout, required working clearances, and required area above and around field-installed motors. Show motor layout, mechanical power transfer link, driven load, and relationship between electrical components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate field measurements.
- D. **Manufacturer Seismic Qualification Certification:** Submit certification that motors, accessories, and components will withstand seismic forces defined in Division 15 Section "Mechanical Vibration and Seismic Controls. Include the following:
  - 1. **Basis for Certification:** Indicate whether withstand certification is based on actual test of assembled components or on calculation.

- a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
- 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
- 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Qualification Data: For testing agency.
- F. Source quality-control test reports.
- G. Field quality-control test reports.
- H. Operation and Maintenance Data: For field-installed motors to include in emergency, operation, and maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Source Limitations: Obtain field-installed motors through one source from a single manufacturer.
- C. Product Options for Field-Installed Motors: Drawings indicate size, profiles, and dimensional requirements of motors and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with NFPA 70.

#### 1.6 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices and features that comply with the following:
  - 1. Compatible with the following:
    - a. Magnetic controllers.
    - b. Multispeed controllers.
    - c. Reduced-voltage controllers.
  - 2. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.

3. Matched to torque and horsepower requirements of the load.
  4. Matched to ratings and characteristics of supply circuit and required control sequence.
- B. Coordinate motor support with requirements for driven load; access for maintenance and motor replacement; installation of accessories, belts, belt guards; and adjustment of sliding rails for belt tensioning.

## PART 2 - PRODUCTS

### 2.1 MOTOR REQUIREMENTS

- A. Motor requirements apply to factory- and field-installed motors except as follows:
1. Different ratings, performance, or characteristics for motor are specified in another Section.
  2. Motorized-equipment manufacturer requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.

### 2.2 MOTOR CHARACTERISTICS

- A. Motors 1/2 HP and Larger: Three phase.
- B. Motors Smaller Than 1/2 HP: Single phase.
- C. Frequency Rating: 60 Hz.
- D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
- E. Service Factor: 1.15 for open drip proof motors; 1.0 for totally enclosed motors.
- F. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
- G. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- H. Enclosure: Open drip-proof.
- I. Efficiency: All motors shall be high or premium efficiency type. They shall conform to NEMA Standard MG-1-12.53a and shall have efficiencies determined with IEEE Standard 112 Method B. The NEMA nominal efficiencies shall be listed on the motor nameplate. Minimum nominal efficiencies shall be as follows:

Premium Efficiency Motor Totally Enclosed Fan Cooled (TEFC)				Premium Efficiency Motor Open Drip Proof (ODP)			
Size HP	Speed (rpm)			Size HP	Speed (rpm)		
	1200	1800	3600		1200	1800	3600
NEMA Nominal Efficiency				NEMA Nominal Efficiency			
1	82.5	85.5	78.5	1	82.5	85.5	80.0
1.5	87.5	86.5	85.5	1.5	86.5	86.5	85.5
2	88.5	86.5	86.5	2	87.5	86.5	86.5
3	89.5	89.5	88.5	3	89.5	89.5	86.5
5	89.5	89.5	89.5	5	89.5	89.5	89.5
7.5	91.7	91.7	91.0	7.5	91.7	91.0	89.5
10	91.7	91.7	91.7	10	91.7	91.7	90.2
15	92.4	92.4	91.7	15	92.4	93.0	91.0
20	92.4	93.0	92.4	20	92.4	93.0	92.4
25	93.0	93.6	93.0	25	93.0	93.6	93.0
30	93.6	93.6	93.0	30	93.6	94.1	93.0
40	94.1	94.1	93.6	40	94.1	94.1	93.6
50	94.1	94.5	94.1	50	94.1	94.5	93.6
60	94.5	95.0	94.1	60	95.0	95.0	94.1
75	95.0	95.4	94.5	75	95.0	95.0	94.5
100	95.4	95.4	95.0	100	95.0	95.4	94.5
125	95.4	95.4	95.4	125	95.4	95.4	95.0
150	95.8	95.8	95.4	150	95.8	95.8	95.4
200+	95.8	96.2	95.8	200+	95.8	95.8	95.4

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Premium, as defined in NEMA MG 1.
- C. Stator: Copper windings, unless otherwise indicated.
  - 1. Multi-speed motors shall have separate winding for each speed.
- D. Rotor: Squirrel cage, unless otherwise indicated.
- E. Bearings: Double-shielded, pre-lubricated ball bearings suitable for radial and thrust loading.
- F. Temperature Rise: Match insulation rating, unless otherwise indicated.
- G. Insulation: Class F, unless otherwise indicated.
- H. Code Letter Designation:
  - 1. Motors 15 HP and Larger: NEMA starting Code G or Code F.
  - 2. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.
- I. Enclosure: Cast iron for motors 7.5 hp (324T) and larger; rolled steel for motors smaller than 7.5 hp (324T).
  - 1. Finish: Gray enamel.

## 2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
  - 1. Designed with critical vibration frequencies outside operating range of controller output.
  - 2. Temperature Rise: Matched to rating for Class B insulation.
  - 3. Insulation: Class H.
  - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Rugged-Duty Motors: Totally enclosed, with 1.25 minimum service factor, greased bearings, integral condensate drains, and capped relief vents. Windings insulated with non-hygroscopic material.
  - 1. Finish: Chemical-resistant paint over corrosion-resistant primer.
- D. Source Quality Control for Field-Installed Motors: Perform the following tests on each motor according to NEMA MG 1:
  - 1. Measure winding resistance.
  - 2. Read no-load current and speed at rated voltage and frequency.
  - 3. Measure locked rotor current at rated frequency.
  - 4. Perform high-potential test.

## 2.5 SINGLE-PHASE MOTORS

- A. Type: One of the following, to suit starting torque and requirements of specific motor application:
  - 1. Permanent-split capacitor.
  - 2. Split-phase start, capacitor run.
  - 3. Capacitor start, capacitor run.
- B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.
- C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.
- D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, prelubricated-sleeve type for other single-phase motors.
- E. Source Quality Control for Field-Installed Motors: Perform the following tests on each motor according to NEMA MG 1:
  - 1. Measure winding resistance.
  - 2. Read no-load current and speed at rated voltage and frequency.
  - 3. Measure locked rotor current at rated frequency.
  - 4. Perform high-potential test.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive field-installed motors for compliance with requirements, installation tolerances, and other conditions affecting performance.
- B. Examine roughing-in for conduit systems to verify actual locations of conduit connections before motor installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 FIELD-INSTALLED MOTOR INSTALLATION

- A. Anchor each motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and align with load transfer link.
- B. Install motors on concrete bases complying with Division 3.
- C. Comply with mounting and anchoring requirements specified in Division 15 Section "Mechanical Vibration and Seismic Controls."

### 3.3 FIELD QUALITY CONTROL FOR FIELD-INSTALLED MOTORS

- A. Prepare for acceptance tests.
  - 1. Align motors, bases, shafts, pulleys, and belts. Tension belts according to manufacturer's written instructions.
  - 2. Verify bearing lubrication.
  - 3. Run each motor with its controller. Demonstrate correct rotation, alignment, and speed at motor design load.
  - 4. Test interlocks and control and safety features for proper operation.
  - 5. Verify that current and voltage for each phase comply with nameplate rating and NEMA MG 1 tolerances.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- C. Testing Agency: City of New York will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- D. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- E. Perform the following field tests and inspections and prepare test reports:
  - 1. Perform electrical tests and visual and mechanical inspections including optional tests and inspections stated in NETA ATS on factory- and field-installed motors. Certify compliance with test parameters.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.4 FIELD-INSTALLED MOTOR DEMONSTRATION

- A. Engage a factory-authorized service representative to train City of New York's maintenance personnel to adjust, operate, and maintain field-installed motors. Refer to Division 1 Section "Closeout Procedures or Demonstration and Training" and any commissioning agent specifications.

END OF SECTION 230513

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## SECTION 230523

### GENERAL - DUTY VALVES FOR HVAC PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

###### A. Section Includes:

1. Bronze angle valves.
2. Bronze ball valves.
3. Iron ball valves.
4. Iron, single-flange butterfly valves.
5. Iron, grooved-end butterfly valves.
6. High-performance butterfly valves.
7. Bronze gate valves.
8. Bronze globe valves.
9. Iron globe valves.
10. Lubricated plug valves.
11. Eccentric plug valves.

###### B. Related Sections:

1. Division 23 HVAC piping Sections for specialty valves applicable to those Sections only.
2. Division 23 Section "Identification for HVAC Piping and Equipment" for valve tags and schedules.

##### 1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, grooves, and weld ends.
  - 3. Set angle, gate, and globe valves closed to prevent rattling.
  - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
  - 5. Set butterfly valves closed or slightly open.
  - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to HVAC valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
  - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
  - 2. Handwheel: For valves other than quarter-turn types.
  - 3. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.
  - 4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug-valve head.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
2. Butterfly Valves: With extended neck.

F. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Grooved: With grooves according to AWWA C606.
3. Solder Joint: With sockets according to ASME B16.18.
4. Threaded: With threads according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

## 2.2 BRONZE BALL VALVES

A. One-Piece, Reduced-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. American Valve, Inc.
  - b. Conbraco Industries, Inc.; Apollo Valves.
  - c. NIBCO INC.
  - d. Milwaukee.
  - e. Powell.
  - f. Stockham
  - g. Apollo
2. Description:
  - a. Standard: MSS SP-110.
  - b. CWP Rating: 400 psig (2760 kPa).
  - c. Body Design: One piece.
  - d. Body Material: Bronze.
  - e. Ends: Threaded.
  - f. Seats: PTFE or TFE.
  - g. Stem: Bronze.
  - h. Ball: Chrome-plated brass.
  - i. Port: Reduced.

B. One-Piece, Reduced-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - j. Conbraco Industries, Inc.; Apollo Valves.
  - k. NIBCO INC.
  - l. Milwaukee
  - m. Stockham
2. Description:
  - a. Standard: MSS SP-110.
  - b. CWP Rating: 600 psig (4140 kPa).
  - c. Body Design: One piece.

- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE or TFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Reduced.

C. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. American Valve, Inc.
  - b. Conbraco Industries, Inc.; Apollo Valves.
  - c. Crane Co.; Crane Valve Group; Crane Valves.
  - d. Hammond Valve.
  - e. Lance Valves; a division of Advanced Thermal Systems, Inc.
  - f. Legend Valve.
  - g. Milwaukee Valve Company.
  - h. NIBCO INC.
  - i. Red-White Valve Corporation.
  - j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- 2. Description:
  - a. Standard: MSS SP-110.
  - b. SWP Rating: 150 psig (1035 kPa).
  - c. CWP Rating: 600 psig (4140 kPa).
  - d. Body Design: Two piece.
  - e. Body Material: Bronze.
  - f. Ends: Threaded.
  - g. Seats: PTFE or TFE.
  - h. Stem: Bronze.
  - i. Ball: Chrome-plated brass.
  - j. Port: Full.

D. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Conbraco Industries, Inc.; Apollo Valves.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Hammond Valve.
  - d. Lance Valves; a division of Advanced Thermal Systems, Inc.
  - e. Milwaukee Valve Company.
  - f. NIBCO INC.
  - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- 2. Description:
  - a. Standard: MSS SP-110.
  - b. SWP Rating: 150 psig.
  - c. CWP Rating: 600 psig.
  - d. Body Design: Two piece.
  - e. Body Material: Bronze.
  - f. Ends: Threaded.

- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

E. Three-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Conbraco Industries, Inc.; Apollo Valves.
  - b. DynaQuip Controls.
  - c. Hammond Valve.
  - d. Milwaukee Valve Company.
  - e. NIBCO INC.
  - f. Red-White Valve Corporation.
2. Description:
  - a. Standard: MSS SP-110.
  - b. SWP Rating: 150 psig
  - c. CWP Rating: 600 psig.
  - d. Body Design: Three piece.
  - e. Body Material: Bronze.
  - f. Ends: Threaded.
  - g. Seats: PTFE or TFE.
  - h. Stem: Bronze.
  - i. Ball: Chrome-plated brass.
  - j. Port: Full.

F. Three-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Conbraco Industries, Inc.; Apollo Valves.
  - b. Hammond Valve.
  - c. Milwaukee Valve Company.
  - d. NIBCO INC.
2. Description:
  - a. Standard: MSS SP-110.
  - b. SWP Rating: 150 psig.
  - c. CWP Rating: 600 psig.
  - d. Body Design: Three piece.
  - e. Body Material: Bronze.
  - f. Ends: Threaded.
  - g. Seats: PTFE or TFE.
  - h. Stem: Stainless steel.
  - i. Ball: Stainless steel, vented.
  - j. Port: Full.

## 2.3 IRON BALL VALVES

A. Class 125, Iron Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. American Valve, Inc.
  - b. Conbraco Industries, Inc.; Apollo Valves.
  - c. Kitz Corporation.
  - d. Sure Flow Equipment Inc.
  - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  
2. Description:
  - a. Standard: MSS SP-72.
  - b. CWP Rating: 200 psig (1380 kPa).
  - c. Body Design: Split body.
  - d. Body Material: ASTM A 126, gray iron.
  - e. Ends: Flanged.
  - f. Seats: PTFE or TFE.
  - g. Stem: Stainless steel.
  - h. Ball: Stainless steel.
  - i. Port: Full.

## 2.4 HIGH-PERFORMANCE BUTTERFLY VALVES

### A. Class 150, Single-Flange, High-Performance Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Bray Controls; a division of Bray International.
  - b. Cooper Cameron Valves; a division of Cooper Cameron Corp.
  - c. Crane Co.; Crane Valve Group; Flowseal.
  - d. Crane Co.; Crane Valve Group; Stockham Division.
  - e. DeZurik Water Controls.
  - f. Hammond Valve.
  - g. Jamesbury; a subsidiary of Metso Automation.
  - h. Milwaukee Valve Company.
  - i. Tyco Valves & Controls; a unit of Tyco Flow Control.
  - j. Keyston Valves
  
2. Description:
  - a. Standard: MSS SP-68.
  - b. CWP Rating: 285 psig (1965 kPa) at 100 deg F (38 deg C).
  - c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
  - d. Body Material: Carbon steel, cast iron, ductile iron, or stainless steel.
  - e. Seat: Reinforced PTFE or metal.
  - f. Stem: Stainless steel; offset from seat plane.
  - g. Disc: Carbon steel.
  - h. Service: Bidirectional.

## 2.5 ECCENTRIC PLUG VALVES

### A. 175 CWP, Eccentric Plug Valves with Resilient Seating.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Clow Valve Co.; a division of McWane, Inc.
  - b. DeZurik Water Controls.
  - c. Homestead Valve; a division of Olson Technologies, Inc.
  - d. M&H Valve Company; a division of McWane, Inc.
  - e. Milliken Valve Company.
  - f. Henry Pratt Company.
  - g. Val-Matic Valve & Manufacturing Corp.
  
2. Description:
  - a. Standard: MSS SP-108.
  - b. CWP Rating: 175 psig minimum.
  - c. Body and Plug: ASTM A 48/A 48M, gray iron; ASTM A 126, gray iron; or ASTM A 536, ductile iron.
  - d. Bearings: Oil-impregnated bronze or stainless steel.
  - e. Ends: Flanged.
  - f. Stem-Seal Packing: Asbestos free.
  - g. Plug, Resilient-Seating Material: Suitable for potable-water service unless otherwise indicated.

## 2.6 CHAINWHEELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Babbitt Steam Specialty Co.
  2. Roto Hammer Industries.
  3. Trumbull Industries.
  
- B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
  1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
  2. Attachment: For connection to ball butterfly and plug valve stems.
  3. Sprocket Rim with Chain Guides: Ductile iron Ductile or cast iron Cast iron Aluminum Bronze, of type and size required for valve. Include zinc coating.
  4. Chain: Hot-dip, galvanized steel, Brass Stainless steel, of size required to fit sprocket rim.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
  
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
  
- C. Examine threads on valve and mating pipe for form and cleanliness.

- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

### 3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install chainwheels on operators for ball butterfly gate globe and plug valves NPS 4 and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor.
- F. Install check valves for proper direction of flow and as follows:
  - 1. Swing Check Valves: In horizontal position with hinge pin level.
  - 2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
  - 3. Lift Check Valves: With stem upright and plumb.

### 3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

### 3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
  - 1. Shutoff Service: Ball, or butterfly, valves.
  - 2. Butterfly Valve Dead-End Service: Single-flange lug type.
  - 3. Throttling Service except Steam: ball, or butterfly valves.
  - 4. Throttling Service, Steam: Globe valves.
  - 5. Pump-Discharge Check Valves:
    - a. NPS 2 and Smaller: Bronze swing check valves with nonmetallic disc.
    - b. NPS 2-1/2 and Larger: Iron swing check valves with lever and weight or with spring or iron, center-guided, metal or resilient-seat check valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
6. For Steel Piping, NPS 5 and Larger: Flanged ends.

### 3.5 CHILLED-WATER VALVE SCHEDULE

#### A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: One piece, regular port, bronze with bronze trim.
3. Bronze Swing Check Valves: Class 125, nonmetallic disc.

#### B. Pipe NPS 2-1/2 and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.
2. Iron Ball Valves, NPS 2-1/2 to NPS 10: Class 150.
3. Iron, Grooved-End Butterfly Valves, NPS 2-1/2 to NPS 12: 175 CWP.
4. High-Performance Butterfly Valves: Class 150, single flange.
5. Iron Swing Check Valves: Class 125, nonmetallic-to-metal seats.
6. Iron Swing Check Valves with Closure Control, NPS 2-1/2 to NPS 12: Class 125, lever and spring.
7. Iron, Plate-Type Check Valves: Class 125 or Class 300; single plate; resilient seat.
8. Iron Globe Valves: Class 125
9. Lubricated Plug Valves: Class 125, regular gland flanged.
10. Eccentric Plug Valves: 175 CWP, resilient seating.

### 3.6 HEATING-WATER VALVE SCHEDULE

#### A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Three piece, full port, brass or bronze with bronze trim.
3. Bronze Swing Check Valves: Class 125 Class 150, bronze nonmetallic disc.

#### B. Pipe NPS 2-1/2 and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.
2. Iron Ball Valves, NPS 2-1/2 to NPS 10: Class 150.
3. Iron, Single-Flange Butterfly Valves, NPS 2-1/2 to NPS 12: 200 CWP, EPDM NBR seat, aluminum-bronze ductile-iron stainless-steel disc.
4. High-Performance Butterfly Valves: Class 150, single flange.
5. Iron Swing Check Valves: Class 125 metal seats.
6. Iron Swing Check Valves with Closure Control, NPS 2-1/2 to NPS 12: Class 125, lever and spring.
7. Iron, Center-Guided Check Valves: Class 125, compact-wafer metal seat.
8. Iron, Plate-Type Check Valves: Class 125; single plate; metal resilient seat.
9. Iron Gate Valves: Class 125 NRS OS&Y.
10. Iron Globe Valves, NPS 2-1/2 to NPS 12: Class 125 Class 250.



## SECTION 230529

### HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following hangers and supports for HVAC system piping and equipment:
  - 1. Steel pipe hangers and supports.
  - 2. Trapeze pipe hangers.
  - 3. Fiberglass pipe hangers.
  - 4. Metal framing systems.
  - 5. Fiberglass strut systems.
  - 6. Thermal-hanger shield inserts.
  - 7. Fastener systems.
  - 8. Pipe stands.
  - 9. Equipment supports.
- B. Related Sections include the following:
  - 1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
  - 2. Division 21 Section "Water-Based Fire-Suppression Systems" for pipe hangers for fire-protection piping.
  - 3. Division 23 Section "Expansion Fittings and Loops for HVAC Piping" for pipe guides and anchors.
  - 4. Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.
  - 5. Division 23 Section(s) "Metal Ducts" for duct hangers and supports.

##### 1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

- C. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

## 1.5 SUBMITTALS

- A. Product Data: For the following:

1. Steel pipe hangers and supports.
2. Fiberglass pipe hangers.
3. Thermal-hanger shield inserts.
4. Powder-actuated fastener systems.

- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers. Include Product Data for components.
2. Metal framing systems. Include Product Data for components.
3. Fiberglass strut systems. Include Product Data for components.
4. Pipe stands. Include Product Data for components.
5. Equipment supports.

- C. Welding certificates.

## 1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel." AWS D1.3, "Structural Welding Code--Sheet Steel." AWS D1.4, "Structural Welding Code--Reinforcing Steel." ASME Boiler and Pressure Vessel Code: Section IX.

- B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
5. ASME Boiler and Pressure Vessel Code: Section IX.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Manufacturers:

1. AAA Technology & Specialties Co., Inc.

2. Bergen-Power Pipe Supports.
3. B-Line Systems, Inc.; a division of Cooper Industries.
4. Carpenter & Paterson, Inc.
5. Empire Industries, Inc.
6. ERICO/Michigan Hanger Co.
7. Globe Pipe Hanger Products, Inc.
8. Grinnell Corp.
9. GS Metals Corp.
10. National Pipe Hanger Corporation.
11. PHD Manufacturing, Inc.
12. PHS Industries, Inc.
13. Piping Technology & Products, Inc.
14. Tolco Inc.

B. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

C. Nonmetallic Coatings: Plastic coating, jacket, or liner.

D. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

### 2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

### 2.4 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.

C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

### 2.5 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.

B. Manufacturers:

1. Carpenter & Paterson, Inc.
2. ERICO/Michigan Hanger Co.
3. PHS Industries, Inc.
4. Pipe Shields, Inc.

5. Rilco Manufacturing Company, Inc.
  6. Value Engineered Products, Inc.
- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate, Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass, ASTM C 552, Type II cellular glass with vapor barrier.
  - D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate, Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass, ASTM C 552, Type II cellular glass.
  - E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
  - F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
  - G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

## 2.6 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  1. Manufacturers:
    - a. Hilti, Inc.
    - b. ITW Ramset/Red Head.
    - c. Masterset Fastening Systems, Inc.
    - d. MKT Fastening, LLC.
    - e. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  1. Manufacturers:
    - a. B-Line Systems, Inc.; a division of Cooper Industries.
    - b. Empire Industries, Inc.
    - c. Hilti, Inc.
    - d. ITW Ramset/Red Head.
    - e. MKT Fastening, LLC.
    - f. Powers Fasteners.

## 2.7 PIPE STAND FABRICATION

- A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
  1. Manufacturers:
    - a. ERICO/Michigan Hanger Co.
    - b. MIRO Industries.

- C. Low-Type, Single-Pipe Stand: One-piece plastic stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
  - 1. Manufacturers:
    - a. MIRO Industries.
  
- D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
  - 1. Manufacturers:
    - a. ERICO/Michigan Hanger Co.
    - b. MIRO Industries.
    - c. Portable Pipe Hangers.
  - 2. Base: Plastic Stainless steel.
  - 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
  - 4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
  
- E. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
  - 1. Manufacturers:
    - a. Portable Pipe Hangers.
  - 2. Bases: One or more plastic.
  - 3. Vertical Members: Two or more protective-coated-steel channels.
  - 4. Horizontal Member: Protective-coated-steel channel.
  - 5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
  
- F. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural-steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

## 2.8 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

## 2.9 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

## PART 3 - EXECUTION

### 3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
  - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
  - 5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
  - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
  - 10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
  - 11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
  - 12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
  - 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
  - 14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
  - 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
  - 16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
  - 17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.

18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
  19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
  20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
  21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

- a. Light (MSS Type 31): 750 lb.
  - b. Medium (MSS Type 32): 1500 lb.
  - c. Heavy (MSS Type 33): 3000 lb.
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
  2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
  3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
  4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
  5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
  6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
  7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
  8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
    - a. Horizontal (MSS Type 54): Mounted horizontally.
    - b. Vertical (MSS Type 55): Mounted vertically.
    - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

### 3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Fiberglass Pipe Hanger Installation: Comply with applicable portions of MSS SP-69 and MSS SP-89. Install hangers and attachments as required to properly support piping from building structure.
- D. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- E. Fiberglass Strut System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled fiberglass struts.
- F. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- G. Fastener System Installation:
  - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- H. Pipe Stand Installation:
  - 1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
  - 2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 07 Section "Roof Accessories" for curbs.
- I. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- J. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- K. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- L. Install lateral bracing with pipe hangers and supports to prevent swaying.

- M. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- N. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.
- P. Insulated Piping: Comply with the following:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 4. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    - b. NPS 4: 12 inches long and 0.06 inch thick.
    - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
  - 5. Pipes NPS 8 and Larger: Include wood inserts.
  - 6. Insert Material: Length at least as long as protective shield.
  - 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

### 3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

### 3.6 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections. Section "High-Performance Coatings."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

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## SECTION 230548

### VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Isolation pads.
  - 2. Isolation mounts.
  - 3. Restrained elastomeric isolation mounts.
  - 4. Freestanding spring isolators.
  - 5. Housed spring mounts.
  - 6. Elastomeric hangers.
  - 7. Spring hangers.
  - 8. Spring hangers with vertical-limit stops.
  - 9. Pipe riser resilient supports.
  - 10. Resilient pipe guides.
  - 11. Restrained vibration isolation roof-curb rails.
  - 12. Seismic snubbers.
  - 13. Restraining braces and cables.
  - 14. Steel and inertia, vibration isolation equipment bases.

##### 1.3 DEFINITIONS

- A. IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Wind-Restraint Loading:
  - 1. Basic Wind Speed: 98 MPH
  - 2. Building Classification Category: II
  - 3. Minimum 10 lb/sq. ft. multiplied by the maximum area of the HVAC component projected on a vertical plane that is normal to the wind direction, and 45 degrees either side of normal.
- B. Seismic-Restraint Loading:
  - 1. Site Class as Defined in the IBC: D.
  - 2. Assigned Seismic Use Group or Building Category as Defined in the IBC: II
    - a. Component Importance Factor: 1.25
    - b. Component Response Modification Factor: 5.0
    - c. Component Amplification Factor: [1.0]

3. Design Spectral Response Acceleration at Short Periods (0.2 Second): Design Spectral Response Acceleration at 1-Second Period:

## 1.5 SUBMITTALS

### A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
  - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by a Professional engineer and provide signed and sealed stamp acceptable to authorities having jurisdiction-NY - BOB
  - b. Annotate to indicate application of each product submitted and compliance with requirements.
3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

### B. Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic and wind forces required to select vibration isolators, seismic and wind restraints, and for designing vibration isolation bases.
  - a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Division 22 Sections for equipment mounted outdoors.
2. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system has been examined for excessive stress and that none will exist.
3. Vibration Isolation Base Details: Detail overall dimensions, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, base weights, equipment static loads, power transmission, component misalignment, and cantilever loads.
4. Seismic- and Wind-Restraint Details:
  - a. Design Analysis: To support selection and arrangement of seismic and wind restraints. Include calculations of combined tensile and shear loads.
  - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
  - c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other Division 22 Sections for equipment mounted outdoors.
  - d. Preapproval and Evaluation Documentation: By a Professional engineer acceptable to NY State licensing, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

- C. Coordination Drawings: Show coordination of seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and seismic restraints.
- D. Welding certificates.
- E. Qualification Data: For professional engineer.
- F. Air-Mounting System Performance Certification: Include natural frequency, load, and damping test data performed by an independent agency.
- G. Field quality-control test reports.
- H. Operation and Maintenance Data: For air-mounting systems to include in operation and maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

### PART 2 - PRODUCTS

#### 2.1 VIBRATION ISOLATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries or a comparable product by one of the following:
  1. Ace Mountings Co., Inc.
  2. Amber/Booth Company, Inc.
  3. California Dynamics Corporation.
  4. Isolation Technology, Inc.
  5. Kinetics Noise Control.

6. Mason Industries.
  7. Vibration Eliminator Co., Inc.
  8. Vibration Isolation.
  9. Vibration Mountings & Controls, Inc.
- D. Pads refer to detail and plans; Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
1. Resilient Material: Oil- and water-resistant neoprene or rubber.
  2. Copy paragraph and subparagraphs below for each type of mount configuration required for Project. Use drawing designation and coordinate with the HVAC Vibration-Control and Seismic-Restraint Device Schedule on Drawings.
- E. Mounts see plans and details; Double-deflection type, with molded, oil-resistant rubber, hermetically sealed compressed fiberglass, or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with baseplate for bolting to structure. Color-code or otherwise identify to indicate capacity range.
1. Materials: Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
  2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.
- F. Restrained Mounts
- All-directional mountings with seismic restraint.
1. Materials: Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
  2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.
- G. Spring Isolators, see plans and details: Freestanding, laterally stable, open-spring isolators.
1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig.
  6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

- H. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.
1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch-thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
  2. Restraint: Seismic or limit stop as required for equipment and authorities having jurisdiction.
  3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
- I. Housed Spring Mounts: Housed spring isolator with integral seismic snubbers.
1. Housing: Ductile-iron or steel housing to provide all-directional seismic restraint.
  2. Base: Factory drilled for bolting to structure.
  3. Snubbers: Vertically adjustable to allow a maximum of 1/4-inch travel up or down before contacting a resilient collar.
- J. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
  7. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.
- K. Spring Hangers with Vertical-Limit Stop: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression and with a vertical-limit stop.
1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
  7. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.

- 8. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.
- L. Pipe Riser Resilient Support: All-directional, acoustical pipe anchor consisting of 2 steel tubes separated by a minimum of 1/2-inch- thick neoprene. Include steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions. Design support for a maximum load on the isolation material of 500 psig and for equal resistance in all directions.
- M. Resilient Pipe Guides: Telescopic arrangement of 2 steel tubes or post and sleeve arrangement separated by a minimum of 1/2-inch- thick neoprene. Where clearances are not readily visible, a factory-set guide height with a shear pin to allow vertical motion due to pipe expansion and contraction shall be fitted. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

## 2.2 RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries or a comparable product by one of the following:
  - 1. Amber/Booth Company, Inc.
  - 2. California Dynamics Corporation.
  - 3. Isolation Technology, Inc.
  - 4. Kinetics Noise Control.
  - 5. Mason Industries.
  - 6. Thybar Corporation.
  - 7. Vibration Eliminator Co., Inc.
  - 8. Vibration Isolation.
  - 9. Vibration Mountings & Controls, Inc.
- D. General Requirements for Restrained Vibration Isolation Roof-Curb Rails: Factory-assembled, fully enclosed, insulated, air- and watertight curb rail designed to resiliently support equipment and to withstand seismic and wind forces.
- E. Lower Support Assembly: Formed sheet-metal section containing adjustable and removable steel springs that support upper frame. Upper frame shall provide continuous support for equipment and shall be captive to resiliently resist seismic and wind forces. Lower support assembly shall have a means for attaching to building structure and a wood nailer for attaching roof materials, and shall be insulated with a minimum of 2 inches of rigid, glass-fiber insulation on inside of assembly.
- F. Spring Isolators: Adjustable, restrained spring isolators shall be mounted on 1/4-inch- thick, elastomeric vibration isolation pads and shall have access ports, for level adjustment, with removable waterproof covers at all isolator locations. Isolators shall be located so they are accessible for adjustment at any time during the life of the installation without interfering with the integrity of the roof.
  - 1. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or wind restraint.

- a. Housing: Steel with resilient vertical-limit stops and adjustable equipment mounting and leveling bolt.
  - b. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  - c. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  - d. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  - e. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
2. Pads: Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
- a. Resilient Material: Oil- and water-resistant standard neoprene.
- G. Snubber Bushings: All-directional, elastomeric snubber bushings at least 1/4 inch thick.
- H. Water Seal: Galvanized sheet metal with EPDM seals at corners, attached to upper support frame, extending down past wood nailer of lower support assembly, and counterflashed over roof materials.

### 2.3 VIBRATION ISOLATION EQUIPMENT BASES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide Mason Industries or a comparable product by one of the following:
- 1. Amber/Booth Company, Inc.
  - 2. California Dynamics Corporation.
  - 3. Isolation Technology, Inc.
  - 4. Kinetics Noise Control.
  - 5. Mason Industries.
  - 6. Vibration Eliminator Co., Inc.
  - 7. Vibration Isolation.
  - 8. Vibration Mountings & Controls, Inc.
- D. Steel Base: Factory-fabricated, welded, structural-steel bases and rails.
- 1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
    - a. Include supports for suction and discharge elbows for pumps.
  - 2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
  - 3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

## 2.4 SEISMIC-RESTRAINT DEVICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide a comparable product by one of the following:
  - 1. Amber/Booth Company, Inc.
  - 2. California Dynamics Corporation.
  - 3. Cooper B-Line, Inc.; a division of Cooper Industries.
  - 4. Hilti, Inc.
  - 5. Kinetics Noise Control.
  - 6. Loos & Co.; Cableware Division.
  - 7. Mason Industries.
  - 8. TOLCO Incorporated; a brand of NIBCO INC.
  - 9. Unistrut; Tyco International, Ltd.
- D. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by a NY State professional engineer signed plans and submission
  - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- E. Snubbers: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
  - 1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
  - 2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
  - 3. Maximum 1/4-inch air gap, and minimum 1/4-inch- thick resilient cushion.
- F. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- G. Restraint Cables: ASTM A 603 galvanized cables with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- H. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.
- I. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.
- J. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

- K. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- L. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
- M. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

## 2.5 FACTORY FINISHES

- A. Finish: Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
  - 1. Powder coating on springs and housings.
  - 2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
  - 3. Baked enamel or powder coat for metal components on isolators for interior use.
  - 4. Color-code or otherwise mark vibration isolation and seismic and wind control devices to indicate capacity range.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic and wind control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by a NY State professional engineer signed and sealed submission.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

### 3.3 VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Comply with requirements in Division 07 Section "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.
- B. Equipment Restraints:
  - 1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
  - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
  - 3. Install seismic-restraint devices using methods approved by a NY State professional engineer providing required submittals for component.
- C. Piping Restraints:
  - 1. Comply with requirements in MSS SP-127.
  - 2. Space lateral supports a maximum of 10 feet o.c., and longitudinal supports a maximum of 15 feet o.c.
  - 3. Brace a change of direction longer than 12 feet.
- D. Install cables so they do not bend across edges of adjacent equipment or building structure.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.
- F. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- G. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- I. Drilled-in Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
  - 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
  - 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
  - 6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

### 3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Division 22 Section "Hydronic Piping" for piping flexible connections.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
  - 2. Schedule test with The City of New York, through Commissioner, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
  - 3. Obtain Commissioner's approval before transmitting test loads to structure. Provide temporary load-spreading members.
  - 4. Test at least four of each type and size of installed anchors and fasteners selected by Commissioner.
  - 5. Test to 90 percent of rated proof load of device.
  - 6. Measure isolator restraint clearance.
  - 7. Measure isolator deflection.
  - 8. Verify snubber minimum clearances.
  - 9. Air-Mounting System Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 10. Air-Mounting System Operational Test: Test the compressed-air leveling system.
  - 11. Test and adjust air-mounting system controls and safeties.
  - 12. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

### 3.6 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust air-spring leveling mechanism.
- D. Adjust active height of spring isolators.
- E. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train The City of New York's maintenance personnel to adjust, operate, and maintain air-mounting systems. Refer to Division 01 Section "Demonstration And Training."

3.8 HVAC VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE

- A. Supported or Suspended Equipment: at ceiling, roof, basement and other floor plans.
  1. Equipment Location: throughout the building, see plans.
  2. Pads:
    - a. Material: Neoprene
    - b. Thickness: min 2 inch under weight.
    - c. Number of Pads: refer to equipment manufacturer recommendation.
  3. Isolator Type: refer to above section
  4. Base Type: refer to above section.
  5. Minimum Deflection: 1.25 in
  6. Component Importance Factor: 1.0.
  7. Component Response Modification Factor: [1.5]
  8. Component Amplification Factor: 1.0

3.9 INSTALLATION APPLICATION

Application		Manuf.	Model	Deflect-inch	
Floor mounted fans & pumps below 1.5 hp	Concrete pad- 4 in	Mason Industry	ND	1.25	
Floor mounted AHU, AC unit	Conc. Pads- 6"	Mason Industry	SL	1	
Ceiling support AHU, tubular fans,		Mason Industry	30 N, HD	1.25	Provide diagonal support to limit horizontal move.

3.10 PIPING GUIDES

- A. Type ADA Manson industries or as approved.

3.11 ACOUSTICAL ANCHORS

- A. Type VPA Mason industries or as approved.

3.12 PIPE SUPPORTS WITHIN SHAFTS

- A. Type W-MII Shearflex – VMCI Type 200N-VEC.

3.13 PIPING SUPPORTS

- A. All water piping hanger rod isolators shall be one of the following or as approved: Type PC30-M.I.I. Type VSHL – V.M.C.I. Type TK-V.E.C Type VXPM- K.D.C
- B. Floor supported water piping shall be mounted on one of the following or as approved: Type SLR -M.I.I. Type AWR -V.M.C.I. Type KW -V.E.C.
- C. Floor mounted strainer and storage tank shall be mounted on one of the following or as approved: Type SLR -M.I.I. Type AWR -V.M.C.I. Type KW -V.E.C.
- D. Mounting for the support of ceiling suspended steam and condensate piping shall be one of the following or as approved: Type RHD -V.M.C.I. Type HD -M.I.I. Type CD -V.E.C.
- E. Floor supported steam and condensate piping including steam pressure reducing stations shall be mounted on one of the following or as approved: Type ND -M.I.I. Type RD -V.M.C.I. Type 368SD -V.E.C.

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## SECTION 230553

### IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

#### PART 1 – GENERAL

##### 1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

##### 1.2. SUMMARY

- A. This Section includes the following mechanical identification materials and their installation:

1. Equipment nameplates.
2. Equipment markers.
3. Equipment signs.
4. Access panel and door markers.
5. Pipe markers.
6. Duct markers.
7. Stencils.
8. Valve tags.
9. Valve schedules.
10. Warning tags.

##### 1.3. SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Valve numbering scheme.
- D. Valve Schedules: For each piping system. Furnish extra copies (in addition to mounted copies) to include in maintenance manuals.

##### 1.4. QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

##### 1.5. COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

## PART 2 - PRODUCTS

### 2.1. EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
  - 1. Data:
    - a. Manufacturer, product name, model number, and serial number.
    - b. Capacity, operating and power characteristics, and essential data.
    - c. Labels of tested compliances.
  - 2. Location: Accessible and visible.
  - 3. Fasteners: As required to mount on equipment.
- B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive.
  - 1. Terminology: Match schedules as closely as possible.
  - 2. Data:
    - a. Name and plan number.
    - b. Equipment service.
    - c. Design capacity.
    - d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
  - 3. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.
- C. Equipment Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
  - 1. Data: Instructions for operation of equipment and for safety procedures.
  - 2. Engraving: Manufacturer's standard letter style, of sizes and with terms to match equipment identification.
  - 3. Thickness: 1/16 inch for units up to 20 sq. in. or 8 inches in length, and 1/8 inch for larger units.
  - 4. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.
- D. Access Panel and Door Markers: 1/16-inch- thick, engraved laminated plastic, with abbreviated terms and numbers corresponding to identification. Provide 1/8-inch center hole for attachment.
  - 1. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

### 2.2. PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
  - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
  - 2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.

3. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
  4. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
  5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pretensioned Pipe Markers: Precoiled semirigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.
  - C. Shaped Pipe Markers: Preformed semirigid plastic formed to partially cover circumference of pipe and to attach to pipe with mechanical fasteners that do not penetrate insulation vapor barrier.
  - D. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.
  - E. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure-sensitive, permanent-type, self-adhesive back.
    1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
    2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

### 2.3. DUCT IDENTIFICATION DEVICES

- A. Duct Markers: Engraved, color-coded laminated plastic. Include direction and quantity of airflow and duct service (such as supply, return, and exhaust). Include contact-type, permanent adhesive.

### 2.4. VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme approved by Commissioner and commissioning agent. Provide 5/32-inch hole for fastener. Tag size minimum 1-1/2" diameter. Retain one of first three subparagraphs below.
  1. Material: 0.0375-inch- thick stainless steel.
  2. Material: 3/32-inch- thick laminated plastic with 2 black surfaces and white inner layer.
  3. Valve-Tag Fasteners: beaded chain.

### 2.5. VALVE SCHEDULES

- A. Valve Schedules: For each piping system, on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
  1. Valve-Schedule Frames: Glazed display frame for removable mounting on masonry walls for each page of valve schedule. Include mounting screws.
  2. Frame: Finished hardwood.
  3. Glazing: ASTM C 1036, Type I, Class 1, Glazing Quality B, 2.5-mm, single-thickness glass.

## 2.6. WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.
  - 1. Size: 3 by 5-1/4 inches minimum.
  - 2. Fasteners: Brass grommet and wire.
  - 3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
  - 4. Color: Yellow background with black lettering.

## PART 3 - EXECUTION

### 3.1. APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 15 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

### 3.2. EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
  - 1. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
  - 2. Pumps, compressors, chillers, condensers, and similar motor-driven units.
  - 3. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
  - 4. Fans, blowers, primary balancing dampers, and mixing boxes.
  - 5. Packaged HVAC central-station and zone-type units.
- B. Install equipment markers with permanent adhesive on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
  - 1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  - 2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
  - 3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
    - a. Edit 10 subparagraphs below to suit Project.
    - b. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
    - c. Fire department hose valves and hose stations.
    - d. Meters, gages, thermometers, and similar units.
    - e. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
    - f. Pumps, compressors, chillers, condensers, and similar motor-driven units.
    - g. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.

- h. Fans, blowers, primary balancing dampers, and mixing boxes.
  - i. Packaged HVAC central-station and zone-type units.
  - j. Tanks and pressure vessels.
  - k. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.
- C. Stenciled Equipment Marker Option: Stenciled markers may be provided instead of laminated-plastic equipment markers, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- D. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.
1. Identify mechanical equipment with equipment markers in the following color codes.
  2. Suggested Color coding; The following color coding shall be used:

Service	A. S. A. Color background	Color Of Letter	Designation
Chilled Water Return	Green	White	CHWR
Chilled Water Supply	Green	White	CHWS
Heating Hot Water Return	Yellow	Black	HWR
Heating Hot Water Supply	Yellow	Black	HWS
Natural Gas	Yellow	Black	GAS
Sanitary Sewer	Green	White	
Sanitary Sewer Vent	Green	White	
Rainwater Leaders	Green	White	
Sprinkler	Red	White	Sprinkler
Standpipe	Red	White	Standpipe

3. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
5. Include signs for the following general categories of equipment:
  - a. Edit eight subparagraphs below to suit Project.
  - b. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
  - c. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
  - d. Pumps, compressors, chillers, condensers, and similar motor-driven units.
  - e. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
  - f. Fans, blowers, primary balancing dampers, and mixing boxes.
  - g. Packaged HVAC central-station and zone-type units.
  - h. Tanks and pressure vessels.

- i. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.
- E. Stenciled Equipment Sign Option: Stenciled signs may be provided instead of laminated-plastic equipment signs, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.
- F. Install access panel markers with screws on equipment access panels.

### 3.3. PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
  - 1. Pipes with OD, Including Insulation, Less Than 6 Inches: Pretensioned pipe markers. Use size to ensure a tight fit.
  - 2. Pipes with OD, Including Insulation, Less Than 6 Inches: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 3/4 inch wide, lapped at least 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.
  - 3. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
  - 4. Pipes with OD, Including Insulation, 6 Inches and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2 inches wide, lapped at least 3 inches at both ends of pipe marker, and covering full circumference of pipe.
- B. Stenciled Pipe Marker Option: Stenciled markers may be provided instead of manufactured pipe markers, at Installer's option. Install stenciled pipe markers with painted, color-coded bands or rectangles complying with ASME A13.1 on each piping system.
  - 1. Identification Paint: Use for contrasting background.
  - 2. Stencil Paint: Use for pipe marking.
- C. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior non-concealed locations as follows:
  - 1. Near each valve and control device.
  - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  - 3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
  - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 5. Near major equipment items and other points of origination and termination.
  - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
  - 7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

### 3.4. DUCT IDENTIFICATION

- A. Install duct markers with permanent adhesive on air ducts in the following color codes:
  - 1. Green: For cold-air supply ducts.
  - 2. Yellow: For hot-air supply ducts.
  - 3. Blue: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
  - 4. ASME A13.1 Colors and Designs: For hazardous material exhaust.
  - 5. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for

greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

- B. Locate markers near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

### 3.5. VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar rough-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with appropriate captions. Submit proposed color coding for approval by Commissioner.
  - 1. Valve-Tag Size and Shape:
    - a. Cold Water: 1-1/2 inches, round.
    - b. Hot Water: 1-1/2 inches, round.
    - c. Fire Protection: 1-1/2 inches, round.
    - d. Gas: 1-1/2 inches, round.
    - e. Steam: 1-1/2 inches, round.

### 3.6. VALVE-SCHEDULE INSTALLATION

- A. Mount valve schedule on wall in accessible location in each major equipment room.

### 3.7. WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

### 3.8. ADJUSTING

- A. Relocate mechanical identification materials and devices that have become visually blocked by other work.

### 3.9. CLEANING

- A. Clean faces of mechanical identification devices and glass frames of valve schedules.

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## SECTION 230593

### TESTING, ADJUSTING, AND BALANCING FOR HVAC

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Balancing Air Systems:
    - a. Constant-volume air systems.
  - 2. Balancing Hydronic Piping Systems:
    - a. Constant-flow hydronic systems.
    - b. Variable-flow hydronic systems.

##### 1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

##### 1.4 SUBMITTALS

- A. LEED Submittal:
  - 1. Air-Balance Report for LEED Prerequisite EQ 1: Documentation of work performed for ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."
- B. Qualification Data: Within 45 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- C. Contract Documents Examination Report: Within 45 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- D. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

- E. Certified TAB reports.
- F. Sample report forms.
- G. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.
  - 2. Serial number.
  - 3. Application.
  - 4. Dates of use.
  - 5. Dates of calibration.

## 1.5 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified by NEBB.
  - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by NEBB.
  - 2. TAB Technician: Employee of the TAB contractor and who is certified by NEBB as a TAB technician.
- B. TAB Conference: Meet with Commissioning Authority and City of New York on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.
  - 1. Agenda Items:
    - a. The Contract Documents examination report.
    - b. The TAB plan.
    - c. Coordination and cooperation of trades and subcontractors.
    - d. Coordination of documentation and communication flow.
- C. Certify TAB field data reports and perform the following:
  - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
  - 2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
- D. TAB Report Forms: Use standard TAB contractor's forms approved by City of New York Construction Manager Commissioning Authority.
- E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

## 1.6 PROJECT CONDITIONS

- A. Full City of New York Occupancy: The City of New York will occupy the site and existing building during entire TAB period. Cooperate with The City of New York during TAB operations to minimize conflicts with The City of New York's operations.

## 1.7 COORDINATION

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 TAB SPECIALISTS

- A. Subject to compliance with requirements, engage one of the following:
  - 1. The TAB contractor's name per list from the construction manager.

### 3.2 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 23 Section "Metal Ducts Nonmetal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
  - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
  - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.
- L. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- N. Examine system pumps to ensure absence of entrained air in the suction piping.
- O. Examine operating safety interlocks and controls on HVAC equipment.
- P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### 3.3 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
  1. Permanent electrical-power wiring is complete.
  2. Hydronic systems are filled, clean, and free of air.
  3. Automatic temperature-control systems are operational.
  4. Equipment and duct access doors are securely closed.
  5. Balance, smoke, and fire dampers are open.
  6. Isolating and balancing valves are open and control valves are operational.
  7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
  8. Windows and doors can be closed so indicated conditions for system operations can be met.

### 3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
  1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
  1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  2. After testing and balancing, install test ports and duct access doors that comply with requirements in Division 23 Section "Air Duct Accessories."
  3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."

- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### 3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

### 3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure total airflow.
    - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
  - 2. Measure fan static pressures as follows to determine actual static pressure:
    - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    - b. Measure static pressure directly at the fan outlet or through the flexible connection.
    - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
    - a. Report the cleanliness status of filters and the time static pressures are measured.
  4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
  5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
  6. Obtain approval from City of New York Construction Manager Commissioning Authority for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
  7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure airflow of submain and branch ducts.
    - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
  2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
  3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
  2. Adjust patterns of adjustable outlets for proper distribution without drafts.
- 3.7 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS
- A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.

- C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:

1. Open all manual valves for maximum flow.
2. Check liquid level in expansion tank.
3. Check makeup water-station pressure gage for adequate pressure for highest vent.
4. Check flow-control valves for specified sequence of operation, and set at indicated flow.
5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
6. Set system controls so automatic valves are wide open to heat exchangers.
7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

### 3.8 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

- A. Balance systems with automatic two-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.

### 3.9 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

### 3.10 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Measure, adjust, and record the following data for each water coil:

1. Entering- and leaving-water temperature.
2. Water flow rate.
3. Water pressure drop.
4. Dry-bulb temperature of entering and leaving air.
5. Wet-bulb temperature of entering and leaving air for cooling coils.
6. Airflow.
7. Air pressure drop.

- B. Measure, adjust, and record the following data for each electric heating coil:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

C. Measure, adjust, and record the following data for each steam coil:

1. Dry-bulb temperature of entering and leaving air.
2. Airflow.
3. Air pressure drop.
4. Inlet steam pressure.

D. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

### 3.11 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 5 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.
4. Cooling-Water Flow Rate: Plus or minus 10 percent.

### 3.12 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

### 3.13 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing Commissioner.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
  2. Name and address of the TAB contractor.
  3. Project name.
  4. Project location.
  5. Architect's name and address.
  6. Engineer's name and address.
  7. Contractor's name and address.
  8. Report date.
  9. Signature of TAB supervisor who certifies the report.
  10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  12. Nomenclature sheets for each item of equipment.
  13. Data for terminal units, including manufacturer's name, type, size, and fittings.
  14. Notes to explain why certain final data in the body of reports vary from indicated values.
  15. Test conditions for fans and pump performance forms including the following:
    - a. Settings for outdoor-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.
    - d. Face and bypass damper settings at coils.
    - e. Fan drive settings including settings and percentage of maximum pitch diameter.
    - f. Inlet vane settings for variable-air-volume systems.
    - g. Settings for supply-air, static-pressure controller.
    - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
  2. Water and steam flow rates.
  3. Duct, outlet, and inlet sizes.
  4. Pipe and valve sizes and locations.
  5. Terminal units.
  6. Balancing stations.
  7. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
    - a. Unit identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Unit arrangement and class.
    - g. Discharge arrangement.

- h. Sheave make, size in inches, and bore.
- i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
- j. Number, make, and size of belts.
- k. Number, type, and size of filters.

2. Motor Data:

- a. Motor make, and frame type and size.
- b. Horsepower and rpm.
- c. Volts, phase, and hertz.
- d. Full-load amperage and service factor.
- e. Sheave make, size in inches, and bore.
- f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

- a. Total air flow rate in cfm.
- b. Total system static pressure in inches wg.
- c. Fan rpm.
- d. Discharge static pressure in inches wg.
- e. Filter static-pressure differential in inches wg.
- f. Preheat-coil static-pressure differential in inches wg.
- g. Cooling-coil static-pressure differential in inches wg.
- h. Heating-coil static-pressure differential in inches wg.
- i. Outdoor airflow in cfm.
- j. Return airflow in cfm.
- k. Outdoor-air damper position.
- l. Return-air damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

- a. System identification.
- b. Location.
- c. Coil type.
- d. Number of rows.
- e. Fin spacing in fins per inch o.c.
- f. Make and model number.
- g. Face area in sq. ft..
- h. Tube size in NPS.
- i. Tube and fin materials.
- j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

- a. Air flow rate in cfm.
- b. Average face velocity in fpm.
- c. Air pressure drop in inches wg.
- d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
- e. Return-air, wet- and dry-bulb temperatures in deg F.
- f. Entering-air, wet- and dry-bulb temperatures in deg F.
- g. Leaving-air, wet- and dry-bulb temperatures in deg F.
- h. Water flow rate in gpm.
- i. Water pressure differential in feet of head or psig.
- j. Entering-water temperature in deg F.
- k. Leaving-water temperature in deg F.
- l. Refrigerant expansion valve and refrigerant types.

- m. Refrigerant suction pressure in psig.
- n. Refrigerant suction temperature in deg F.
- o. Inlet steam pressure in psig.

G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

- a. System identification.
- b. Location.
- c. Make and type.
- d. Model number and unit size.
- e. Manufacturer's serial number.
- f. Fuel type in input data.
- g. Output capacity in Btu/h.
- h. Ignition type.
- i. Burner-control types.
- j. Motor horsepower and rpm.
- k. Motor volts, phase, and hertz.
- l. Motor full-load amperage and service factor.
- m. Sheave make, size in inches, and bore.
- n. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Test Data (Indicated and Actual Values):

- a. Total air flow rate in cfm.
- b. Entering-air temperature in deg F.
- c. Leaving-air temperature in deg F.
- d. Air temperature differential in deg F.
- e. Entering-air static pressure in inches wg.
- f. Leaving-air static pressure in inches wg.
- g. Air static-pressure differential in inches wg.
- h. Low-fire fuel input in Btu/h.
- i. High-fire fuel input in Btu/h.
- j. Manifold pressure in psig.
- k. High-temperature-limit setting in deg F.
- l. Operating set point in Btu/h.
- m. Motor voltage at each connection.
- n. Motor amperage for each phase.
- o. Heating value of fuel in Btu/h.

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

- a. System identification.
- b. Location.
- c. Make and type.
- d. Model number and size.
- e. Manufacturer's serial number.
- f. Arrangement and class.
- g. Sheave make, size in inches, and bore.
- h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:

- a. Motor make, and frame type and size.

- b. Horsepower and rpm.
- c. Volts, phase, and hertz.
- d. Full-load amperage and service factor.
- e. Sheave make, size in inches, and bore.
- f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
- g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

- a. Total airflow rate in cfm.
- b. Total system static pressure in inches wg.
- c. Fan rpm.
- d. Discharge static pressure in inches wg.
- e. Suction static pressure in inches wg.

I. Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

- a. System and air-handling-unit number.
- b. Location and zone.
- c. Traverse air temperature in deg F.
- d. Duct static pressure in inches wg.
- e. Duct size in inches.
- f. Duct area in sq. ft..
- g. Indicated air flow rate in cfm.
- h. Indicated velocity in fpm.
- i. Actual air flow rate in cfm.
- j. Actual average velocity in fpm.
- k. Barometric pressure in psig.

J. Air-Terminal-Device (FCU, VAV, FP Box) Reports:

1. Unit Data:

- a. System and air-handling unit identification.
- b. Location and zone.
- c. Apparatus used for test.
- d. Area served.
- e. Make.
- f. Number from system diagram.
- g. Type and model number.
- h. Size.
- i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

- a. Air flow rate in cfm.
- b. Air velocity in fpm.
- c. Preliminary air flow rate as needed in cfm.
- d. Preliminary velocity as needed in fpm.
- e. Final air flow rate in cfm.
- f. Final velocity in fpm.
- g. Space temperature in deg F.

K. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:
  - a. System and air-handling-unit identification.
  - b. Location and zone.
  - c. Room or riser served.
  - d. Coil make and size.
  - e. Flowmeter type.

2. Test Data (Indicated and Actual Values):
  - a. Air flow rate in cfm.
  - b. Entering-water temperature in deg F.
  - c. Leaving-water temperature in deg F.
  - d. Water pressure drop in feet of head or psig.
  - e. Entering-air temperature in deg F.
  - f. Leaving-air temperature in deg F.

L. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:
  - a. Unit identification.
  - b. Location.
  - c. Service.
  - d. Make and size.
  - e. Model number and serial number.
  - f. Water flow rate in gpm.
  - g. Water pressure differential in feet of head or psig.
  - h. Required net positive suction head in feet of head or psig.
  - i. Pump rpm.
  - j. Impeller diameter in inches.
  - k. Motor make and frame size.
  - l. Motor horsepower and rpm.
  - m. Voltage at each connection.
  - n. Amperage for each phase.
  - o. Full-load amperage and service factor.
  - p. Seal type.

2. Test Data (Indicated and Actual Values):
  - a. Static head in feet of head or psig.
  - b. Pump shutoff pressure in feet of head or psig.
  - c. Actual impeller size in inches.
  - d. Full-open flow rate in gpm.
  - e. Full-open pressure in feet of head or psig.
  - f. Final discharge pressure in feet of head or psig.
  - g. Final suction pressure in feet of head or psig.
  - h. Final total pressure in feet of head or psig.
  - i. Final water flow rate in gpm.
  - j. Voltage at each connection.
  - k. Amperage for each phase.

M. Instrument Calibration Reports:

1. Report Data:

- a. Instrument type and make.
- b. Serial number.
- c. Application.
- d. Dates of use.
- e. Dates of calibration.

### 3.14 INSPECTIONS

#### A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:
  - a. Measure airflow of at least 10 percent of air outlets.
  - b. Measure water flow of at least 5 percent of terminals.
  - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
  - d. Verify that balancing devices are marked with final balance position.
  - e. Note deviations from the Contract Documents in the final report.

#### B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Construction Manager Commissioning Authority.
2. The TAB contractor's test and balance Commissioner shall conduct the inspection in the presence of Construction Manager Commissioning Authority.
3. Construction Manager Commissioning Authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

#### C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, City of New York may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

#### D. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

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## SECTION 230700

### HVAC INSULATION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

- 1. Insulation Materials:

- a. Calcium silicate.
    - b. Cellular glass.
    - c. Flexible elastomeric.
    - d. Mineral fiber.
    - e. Phenolic.
    - f. Polyisocyanurate.
    - g. Polyolefin.
    - h. Polystyrene.

- 2. Fire-rated insulation systems.
    - 3. Insulating cements.
    - 4. Adhesives.
    - 5. Mastics.
    - 6. Lagging adhesives.
    - 7. Sealants.
    - 8. Factory-applied jackets.
    - 9. Field-applied fabric-reinforcing mesh.
    - 10. Field-applied cloths.
    - 11. Field-applied jackets.
    - 12. Tapes.
    - 13. Securements.
    - 14. Corner angles.

- B. Related Sections:

- 1. Division 22 Section "Plumbing Insulation."
    - 2. Division 23 Section "Metal Ducts" for duct liners.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).
- B. LEED Submittal:

1. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.
  2. All the adhesive material shall comply with guideline noted in the LEED guideline to meet the appropriate Credit noted above.
- C. Shop Drawings:
1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  2. Detail attachment and covering of heat tracing inside insulation.
  3. Detail insulation application at pipe expansion joints for each type of insulation.
  4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
  5. Detail removable insulation at piping specialties, equipment connections, and access panels.
  6. Detail application of field-applied jackets.
  7. Detail application at linkages of control devices.
  8. Detail field application for each equipment type.
- D. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use.
1. Sample Sizes:
    - a. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
    - b. Sheet Form Insulation Materials: 12 inches square.
    - c. Jacket Materials for Pipe: 12 inches long by NPS 2.
    - d. Sheet Jacket Materials: 12 inches square.
    - e. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.
- E. Qualification Data: For qualified Installer.
- F. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- G. Field quality-control reports.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
- C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Commissioner. Use materials indicated for the completed Work.

1. Piping Mockups:

- a. One 10-foot section of NPS 2 straight pipe.
- b. One each of a 90-degree threaded, welded, and flanged elbow.
- c. One each of a threaded, welded, and flanged tee fitting.
- d. One NPS 2 or smaller valve, and one NPS 2-1/2 or larger valve.
- e. Four support hangers including hanger shield and insert.
- f. One threaded strainer and one flanged strainer with removable portion of insulation.
- g. One threaded reducer and one welded reducer.
- h. One pressure temperature tap.
- i. One mechanical coupling.

2. Ductwork Mockups:

- a. One 10-foot section each of rectangular and round straight duct.
- b. One each of a 90-degree mitered round and rectangular elbow, and one each of a 90-degree radius round and rectangular elbow.
- c. One rectangular branch takeoff and one round branch takeoff from a rectangular duct. One round tee fitting.
- d. One rectangular and round transition fitting.
- e. Four support hangers for round and rectangular ductwork.

3. Equipment Mockups:

- a. One chilled-water pump and one heating-hot-water pump.
- b. One tank or vessel.

4. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
5. Notify Commissioner seven days in advance of dates and times when mockups will be constructed.
6. Obtain Commissioner's approval of mockups before starting insulation application.
7. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Commissioner specifically approves such deviations in writing.
8. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
9. Demolish and remove mockups when directed.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

## 1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

## 1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## PART 2 - PRODUCTS

### 2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Calcium Silicate:
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Industrial Insulation Group (The); Thermo-12 Gold.
  - 2. Preformed Pipe Sections: Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
  - 3. Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.

4. Prefabricated Fitting Covers: Comply with ASTM C 450 and ASTM C 585 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.
- G. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cell-U-Foam Corporation; Ultra-CUF.
    - b. Pittsburgh Corning Corporation; Foamglas Super K.
    - c. Owens Corning
  2. Block Insulation: ASTM C 552, Type I.
  3. Special-Shaped Insulation: ASTM C 552, Type III.
  4. Board Insulation: ASTM C 552, Type IV.
  5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
  6. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
  7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- H. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Aeroflex USA Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
- I. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I II with factory-applied vinyl jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; Duct Wrap.
    - b. Johns Manville; Microlite.
    - c. Knauf Insulation; Duct Wrap.
    - d. Manson Insulation Inc.; Alley Wrap.
    - e. Owens Corning; All-Service Duct Wrap.
- J. High-Temperature, Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type V, without factory-applied jacket.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Johns Manville; HTB 23 Spin-Glas.
    - b. Owens Corning; High Temperature Flexible Batt Insulations.
- K. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation without factory-applied jacket with factory-applied ASJ. For equipment applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide the following:
  - a. CertainTeed Corp.; Commercial Board.
  - b. Fibrex Insulations Inc.; FBX.
  - c. Johns Manville; 800 Series Spin-Glas.
  - d. Knauf Insulation; Insulation Board.
  - e. Manson Insulation Inc.; AK Board.
  - f. Owens Corning; Fiberglas 700 Series.
  
- L. Mineral-Fiber, Preformed Pipe Insulation:
  1. Products: Subject to compliance with requirements, provide the following:
    - a. Fibrex Insulations Inc.; Coreplus 1200.
    - b. Johns Manville; Micro-Lok.
    - c. Knauf Insulation; 1000 Pipe Insulation.
    - d. Manson Insulation Inc.; Alley-K.
    - e. Owens Corning; Fiberglas Pipe Insulation.
  2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, without factory-applied jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  3. Type II, 1200 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, without factory-applied jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  
- M. Mineral-Fiber, Pipe Insulation Wicking System: Preformed pipe insulation complying with ASTM C 547, Type I, Grade A, with absorbent cloth factory applied to the entire inside surface of preformed pipe insulation and extended through the longitudinal joint to outside surface of insulation under insulation jacket. Factory apply a white, polymer, vapor-retarder jacket with self-sealing adhesive tape seam and evaporation holes running continuously along the longitudinal seam, exposing the absorbent cloth.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Knauf Insulation; Permawick Pipe Insulation.
    - b. Owens Corning; VaporWick Pipe Insulation.
  
- N. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied FSK jacket complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  1. Products: Subject to compliance with requirements, provide the following:
    - a. CertainTeed Corp.; CrimpWrap.
    - b. Johns Manville; MicroFlex.
    - c. Knauf Insulation; Pipe and Tank Insulation.
    - d. Manson Insulation Inc.; AK Flex.
    - e. Owens Corning; Fiberglas Pipe and Tank Insulation.
  
- O. Polystyrene: Rigid, extruded cellular polystyrene intended for use as thermal insulation. Comply with ASTM C 578, Type IV or Type XIII, except thermal conductivity (k-value) shall not

exceed 0.26 Btu x in./h x sq. ft. x deg F after 180 days of aging. Fabricate shapes according to ASTM C 450 and ASTM C 585.

1. Products: Subject to compliance with requirements, provide the following:

- a. Dow Chemical Company (The); Styrofoam.
- b. Knauf Insulation; Knauf Polystyrene.

## 2.2 FIRE-RATED INSULATION SYSTEMS

A. Fire-Rated Board: Structural-grade, press-molded, xonolite calcium silicate, fireproofing board suitable for operating temperatures up to 1700 deg F. Comply with ASTM C 656, Type II, Grade 6. tested and certified to provide a 2-hour fire rating by a NRTL acceptable to authority having jurisdiction.

1. Products: Subject to compliance with requirements, provide the following:

- a. Johns Manville; Super Firetemp M.

B. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a 2-hour fire rating by a NRTL acceptable to authority having jurisdiction.

1. Products: Subject to compliance with requirements, provide the following:

- a. CertainTeed Corp.; FlameChek.
- b. Johns Manville; Firetemp Wrap.
- c. Nelson Firestop Products; Nelson FSB Flameshield Blanket.
- d. Thermal Ceramics; FireMaster Duct Wrap.
- e. 3M; Fire Barrier Wrap Products.
- f. Unifrax Corporation; FyreWrap.
- g. Vesuvius; PYROSCAT FP FASTR Duct Wrap.

C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

1. Products: Subject to compliance with requirements, provide the following:

- a. Insulco, Division of MFS, Inc.; SmoothKote.
- b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
- c. Rock Wool Manufacturing Company; Delta One Shot.

## 2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Calcium Silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 to 800 deg F.

1. Products: Subject to compliance with requirements, provide the following:

- a. Childers Products, Division of ITW; CP-97.
- b. Foster Products Corporation, H. B. Fuller Company; 81-27/81-93.

- c. Marathon Industries, Inc.; 290.
  - d. Mon-Eco Industries, Inc.; 22-30.
  - e. Vimasco Corporation; 760.
- 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Cellular-Glass, Phenolic, Polyisocyanurate, and Polystyrene Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Childers Products, Division of ITW; CP-96.
    - b. Foster Products Corporation, H. B. Fuller Company; 81-33.
  - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Aeroflex USA Inc.; Aero seal.
    - b. Armacell LCC; 520 Adhesive.
    - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
    - d. RBX Corporation; Rubatex Contact Adhesive.
  - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Childers Products, Division of ITW; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.
  - 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Polystyrene Adhesive: Solvent- or water-based, synthetic resin adhesive with a service temperature range of minus 20 to plus 140 deg F.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Childers Products, Division of ITW; CP-96.
    - b. Foster Products Corporation, H. B. Fuller Company; 97-13.
- G. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
  - 1. Products: Subject to compliance with requirements, provide the following:

- a. Childers Products, Division of ITW; CP-82.
  - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
  - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
  - d. Marathon Industries, Inc.; 225.
  - e. Mon-Eco Industries, Inc.; 22-25.
2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of <Insert value> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide the following:

- a. Childers Products, Division of ITW; CP-35.
- b. Foster Products Corporation, H. B. Fuller Company; 30-90.
- c. ITW TACC, Division of Illinois Tool Works; CB-50.
- d. Marathon Industries, Inc.; 590.
- e. Mon-Eco Industries, Inc.; 55-40.
- f. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
5. Color: White.

- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide the following:

- a. Childers Products, Division of ITW; CP-30.
- b. Foster Products Corporation, H. B. Fuller Company; 30-35.
- c. ITW TACC, Division of Illinois Tool Works; CB-25.
- d. Marathon Industries, Inc.; 501.
- e. Mon-Eco Industries, Inc.; 55-10.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
3. Service Temperature Range: 0 to 180 deg F.
4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
5. Color: White.

- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide the following:

- a. Childers Products, Division of ITW; Encacel.
  - b. Foster Products Corporation, H. B. Fuller Company; 60-95/60-96.
  - c. Marathon Industries, Inc.; 570.
  - d. Mon-Eco Industries, Inc.; 55-70.
- 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
  - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
  - 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
  - 5. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
- 1. Products: Subject to compliance with requirements, provide the following:
    - a. Childers Products, Division of ITW; CP-10.
    - b. Foster Products Corporation, H. B. Fuller Company; 35-00.
    - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
    - d. Marathon Industries, Inc.; 550.
    - e. Mon-Eco Industries, Inc.; 55-50.
    - f. Vimasco Corporation; WC-1/WC-5.
  - 2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.
  - 3. Service Temperature Range: Minus 20 to plus 200 deg F.
  - 4. Solids Content: 63 percent by volume and 73 percent by weight.
  - 5. Color: White.

## 2.5 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
- 1. For indoor applications, use lagging adhesives that have a VOC content noted in LEED guideline or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Products: Subject to compliance with requirements, provide the following:
    - a. Childers Products, Division of ITW; CP-52.
    - b. Foster Products Corporation, H. B. Fuller Company; 81-42.
    - c. Marathon Industries, Inc.; 130.
    - d. Mon-Eco Industries, Inc.; 11-30.
    - e. Vimasco Corporation; 136.
  - 2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct, equipment, and pipe insulation.
  - 3. Service Temperature Range: Minus 50 to plus 180 deg F.
  - 4. Color: White.

## 2.6 SEALANTS

- A. Joint Sealants:
- 1. Joint Sealants for Cellular-Glass, Phenolic, and Polyisocyanurate Products: Subject to compliance with requirements, provide the following:

- a. Childers Products, Division of ITW; CP-76.
  - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Pittsburgh Corning Corporation; Pittseal 444.
  - f. Vimasco Corporation; 750.
2. Joint Sealants for Polystyrene Products: Subject to compliance with requirements, provide one of the following:

- g. Childers Products, Division of ITW; CP-70.
- h. Foster Products Corporation, H. B. Fuller Company; 30-45/30-46.
- i. Marathon Industries, Inc.; 405.
- j. Mon-Eco Industries, Inc.; 44-05.
- k. Vimasco Corporation; 750.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Permanently flexible, elastomeric sealant.
4. Service Temperature Range: Minus 100 to plus 300 deg F.
5. Color: White or gray.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide the following:
  - a. Childers Products, Division of ITW; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.7 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
  2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
  3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
  4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
  5. PVDC Jacket for Indoor Applications: 4-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.

- a. Products: Subject to compliance with requirements, provide the following:
  - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.
- 6. PVDC Jacket for Outdoor Applications: 6-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.
  - a. Products: Subject to compliance with requirements, provide the following:
    - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.
- 7. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
  - a. Products: Subject to compliance with requirements, provide the following:
    - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.
- 8. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.8 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Fabric for Pipe Insulation: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. inch for covering pipe and pipe fittings.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Vimasco Corporation; Elastafab 894.
- B. Woven Glass-Fiber Fabric for Duct and Equipment Insulation: Approximately 6 oz./sq. yd. with a thread count of 5 strands by 5 strands/sq. inch for covering equipment.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Childers Products, Division of ITW; Chil-Glas No. 5.
- C. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. inch, in a Leno weave, for duct, equipment, and pipe.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Foster Products Corporation, H. B. Fuller Company; Mast-A-Fab.
    - b. Vimasco Corporation; Elastafab 894.

## 2.9 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd..
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Alpha Associates, Inc.; Alpha-Maritex 84215 and 84217/9485RW, Luben 59.

## 2.10 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Johns Manville; Zeston.
    - b. P.I.C. Plastics, Inc.; FG Series.
    - c. Proto PVC Corporation; LoSmoke.
    - d. Speedline Corporation; SmokeSafe.
  - 2. Adhesive: As recommended by jacket material manufacturer.
  - 3. Color: White Color-code jackets based on system. Color as selected by Commissioner.
  - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
    - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
  - 5. Factory-fabricated tank heads and tank side panels.
- D. Metal Jacket:
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Childers Products, Division of ITW; Metal Jacketing Systems.
    - b. PABCO Metals Corporation; Surefit.
    - c. RPR Products, Inc.; Insul-Mate.
  - 2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
    - a. Sheet and roll stock ready for shop or field sizing, Factory cut and rolled to size.
    - b. Finish and thickness are indicated in field-applied jacket schedules.
    - c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil-thick Polysurlyn.
    - d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil- thick Polysurlyn.

e. Factory-Fabricated Fitting Covers:

- 1) Same material, finish, and thickness as jacket.
- 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
- 3) Tee covers.
- 4) Flange and union covers.
- 5) End caps.
- 6) Beveled collars.
- 7) Valve covers.
- 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

3. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.

- a. Sheet and roll stock ready for shop or field sizing, Factory cut and rolled to size.
- b. Material, finish, and thickness are indicated in field-applied jacket schedules.
- c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper, 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil-thick Polysurlyn.
- d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper, 2.5-mil- thick Polysurlyn.
- e. Factory-Fabricated Fitting Covers:

- 1) Same material, finish, and thickness as jacket.
- 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
- 3) Tee covers.
- 4) Flange and union covers.
- 5) End caps.
- 6) Beveled collars.
- 7) Valve covers.
- 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

E. Underground Direct-Buried Jacket: 125-mil- thick vapor barrier and waterproofing membrane consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.

1. Products: Subject to compliance with requirements, provide the following:

- a. Pittsburgh Corning Corporation; Pittwrap.
- b. Polyguard; Insulrap No Torch 125.

F. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, provide the following:

- a. Polyguard; Alumaguard 60.

- G. PVDC Jacket for Indoor Applications: 4-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Dow Chemical Company (The), Saran 540 Vapor Retarder Film.
- H. PVDC Jacket for Outdoor Applications: 6-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Dow Chemical Company (The), Saran 560 Vapor Retarder Film.
- I. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

## 2.11 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
    - b. Compac Corp.; 104 and 105.
    - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
    - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
  2. Width: 3 inches.
  3. Thickness: 11.5 mils.
  4. Adhesion: 90 ounces force/inch in width.
  5. Elongation: 2 percent.
  6. Tensile Strength: 40 lbf/inch in width.
  7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
    - b. Compac Corp.; 110 and 111.
    - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
    - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
  2. Width: 3 inches.

3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide the following:
  - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
  - b. Compac Corp.; 130.
  - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
  - d. Venture Tape; 1506 CW NS.
2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide the following:
  - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
  - b. Compac Corp.; 120.
  - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
  - d. Venture Tape; 3520 CW.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

E. PVDC Tape for Indoor Applications: White vapor-retarder PVDC tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide the following:
  - a. Dow Chemical Company (The); Saran 540 Vapor Retarder Tape.
2. Width: 3 inches.
3. Film Thickness: 4 mils.
4. Adhesive Thickness: 1.5 mils.
5. Elongation at Break: 145 percent.
6. Tensile Strength: 55 lbf/inch in width.

F. PVDC Tape for Outdoor Applications: White vapor-retarder PVDC tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide the following:
  - a. Dow Chemical Company (The); Saran 560 Vapor Retarder Tape.

2. Width: 3 inches.
3. Film Thickness: 6 mils.
4. Adhesive Thickness: 1.5 mils.
5. Elongation at Break: 145 percent.
6. Tensile Strength: 55 lbf/inch in width.

## 2.12 SECUREMENTS

### A. Bands:

1. Products: Subject to compliance with requirements, provide the following:
  - a. Childers Products; Bands.
  - b. PABCO Metals Corporation; Bands.
  - c. RPR Products, Inc.; Bands.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 316 304 or Type 316; 0.015 inch thick, 1/2 inch 3/4 inch wide with wing seal closed seal wing or closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch 3/4 inch wide with wing seal closed seal wing or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

### B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- 0.135-inch- diameter shank, length to suit depth of insulation indicated.
  - a. Products: Subject to compliance with requirements, provide the following:
    - 1) AGM Industries, Inc.; CWP-1.
    - 2) GEMCO; CD.
    - 3) Midwest Fasteners, Inc.; CD.
    - 4) Nelson Stud Welding; TPA, TPC, and TPS.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- 0.135-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
  - a. Products: Subject to compliance with requirements, provide the following:
    - 1) AGM Industries, Inc.; CWP-1.
    - 2) GEMCO; Cupped Head Weld Pin.
    - 3) Midwest Fasteners, Inc.; Cupped Head.
    - 4) Nelson Stud Welding; CHP.
3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
  - a. Products: Subject to compliance with requirements, provide the following:

- 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
  - 2) GEMCO; Perforated Base.
  - 3) Midwest Fasteners, Inc.; Spindle.
- b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - c. Spindle: Copper- or zinc-coated, low carbon steel Aluminum Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Products: Subject to compliance with requirements, provide the following:
    - 1) GEMCO; Nylon Hangers.
    - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
  - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
  - c. Spindle: Nylon, 0.106-inch- diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Products: Subject to compliance with requirements, provide the following:
    - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series TSA.
    - 2) GEMCO; Press and Peel.
    - 3) Midwest Fasteners, Inc.; Self Stick.
  - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - c. Spindle: Copper- or zinc-coated, low carbon steel Aluminum Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
  - d. Adhesive-backed base with a peel-off protective cover.
6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel, aluminum, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- a. Products: Subject to compliance with requirements, provide the following:
    - 1) AGM Industries, Inc.; RC-150.
    - 2) GEMCO; R-150.
    - 3) Midwest Fasteners, Inc.; WA-150.
    - 4) Nelson Stud Welding; Speed Clips.

- b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
- 7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
  - a. Products: Subject to compliance with requirements, provide the following:
    - 1) GEMCO.
    - 2) Midwest Fasteners, Inc.
  - C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
  - D. Wire: 0.080-inch nickel-copper alloy 0.062-inch soft-annealed, stainless steel 0.062-inch soft-annealed, galvanized steel.
    - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. C & F Wire.
      - b. Childers Products.
      - c. PABCO Metals Corporation.
      - d. RPR Products, Inc.

## 2.13 CORNER ANGLES

- A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.
- C. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 316 304 or 316.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
  - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
  - 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### 3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.

2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth.
  2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches (50 mm)4 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
  2. Testing agency labels and stamps.
  3. Nameplates and data plates.
  4. Cleanouts.

### 3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation,

- install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
1. Comply with requirements in Division 07 Section "Penetration Firestopping"irestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
  2. Pipe: Install insulation continuously through floor penetrations.
  3. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

### 3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
  2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular

- surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
  6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
  3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe

- insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

### 3.6 CALCIUM SILICATE INSULATION INSTALLATION

#### A. Insulation Installation on Boiler Breechings and Ducts:

1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation material.
2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.
3. On exposed applications without metal jacket, finish insulation surface with a skim coat of mineral-fiber, hydraulic-setting cement. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth. Overlap edges at least 1 inch. Apply finish coat of lagging adhesive over glass cloth. Thin finish coat to achieve smooth, uniform finish.

#### B. Insulation Installation on Straight Pipes and Tubes:

1. Secure single-layer insulation with stainless-steel bands at 12-inch intervals and tighten bands without deforming insulation materials.
2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with wire spaced at 12-inch intervals. Secure outer layer with stainless-steel bands at 12-inch intervals.
3. Apply a skim coat of mineral-fiber, hydraulic-setting cement to insulation surface. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth or tape. Overlap edges at least 1 inch. Apply finish coat of lagging adhesive over glass cloth or tape. Thin finish coat to achieve smooth, uniform finish.

#### C. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as pipe insulation.
4. Finish flange insulation same as pipe insulation.

#### D. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed insulation sections of insulation are not available, install mitered sections of calcium silicate insulation. Secure insulation materials with wire or bands.
3. Finish fittings insulation same as pipe insulation.

#### E. Insulation Installation on Valves and Pipe Specialties:

1. Install mitered segments of calcium silicate insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.

2. Install insulation to flanges as specified for flange insulation application.
3. Finish valve and specialty insulation same as pipe insulation.

### 3.7 CELLULAR-GLASS INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

#### B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

#### C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

#### D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

### 3.8 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

- #### A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

#### B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

### 3.9 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.

2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

E. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
  - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
  - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
  - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
  - d. Do not overcompress insulation during installation.
  - e. Impale insulation over pins and attach speed washers.
  - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
  - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
  - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.

6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- F. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
  2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
  3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    - d. Do not overcompress insulation during installation.
    - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
    - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
  5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

### 3.10 POLYISOCYANURATE INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with tape or bands and tighten without deforming insulation materials. Orient longitudinal joints between half sections in 3 and 9 o'clock positions on the pipe.
2. For insulation with factory-applied jackets with vapor barriers, do not staple longitudinal tabs but secure tabs with additional adhesive or tape as recommended by insulation material manufacturer and seal with vapor-barrier mastic.
3. All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor barrier must be continuous. Before installing jacket material, install vapor-barrier system.

#### B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, same thickness of adjacent pipe insulation, not to exceed 1-1/2-inch thickness.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyisocyanurate block insulation of same thickness as pipe insulation.

#### C. Insulation Installation on Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

#### D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of polyisocyanurate insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

### 3.11 POLYSTYRENE INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation with tape or bands and tighten bands without deforming insulation materials. Orient longitudinal joints between half sections in 3 and 9 o'clock positions on the pipe.
2. For insulation with factory-applied jackets with vapor barriers, do not staple longitudinal tabs but secure tabs with additional adhesive or tape as recommended by insulation material manufacturer and seal with vapor-barrier mastic.
3. All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor barrier must be continuous. Before installing jacket material, install vapor-barrier system.

#### B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, same thickness of adjacent pipe insulation, not to exceed 1-1/2-inch thickness.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polystyrene block insulation of same thickness as pipe insulation.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed insulation sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed section of polystyrene insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

### 3.12 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

E. Where PVDC jackets are indicated, install as follows:

1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
2. Wrap factory-presizes jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install presized jacket with an approximate overlap at butt joint of 2 inches over the previous section. Adhere lap seal using

adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.

3. Continuous jacket can be spiral wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches or less. The 33-1/2-inch- circumference limit allows for 2-inch- overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

### 3.13 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 07 Section "Penetration Firestopping."

### 3.14 FINISHES

- A. Duct, Equipment, and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
  1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
    - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Commissioner. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

### 3.15 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  1. Inspect ductwork, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be

limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

2. Inspect field-insulated equipment, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.
3. Inspect pipe, fittings, strainers, and valves, randomly selected by Commissioner, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

### 3.16 DUCT INSULATION SCHEDULE, GENERAL

#### A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed, Type I, commercial, kitchen hood exhaust.
4. Outdoor, exposed supply and return.

#### B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

### 3.17 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

#### A. Concealed, supply-air duct insulation shall be one of the following:

1. Flexible Elastomeric: 1 inch thick.
2. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
3. Mineral-Fiber Board: 1-1/2 inchesthick and 2-lb/cu. ft. nominal density.

#### B. Concealed, return-air duct insulation shall be one of the following:

1. Flexible Elastomeric: 1 inch thick.
2. Mineral-Fiber Blanket: 1-1/2 inchesthick and 0.75-lb/cu. ft. nominal density.

#### C. Concealed, outdoor-air duct insulation shall be one of the following:

1. Flexible Elastomeric: 1 inch thick.
2. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.

D. Concealed, supply-air plenum insulation shall be one of the following:

1. Flexible Elastomeric: 1 inch thick.
2. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density.
3. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.

E. Concealed, outdoor-air plenum insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.

F. Exposed, supply-air duct insulation shall be one of the following:

1. Flexible Elastomeric: 1 inch thick.
2. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
3. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.

### 3.18 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Insulation materials and thicknesses are identified below. If more than one material is listed for a duct system, selection from materials listed is Contractor's option.

B. Supply/ return -air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 2 inches and 1.5-lb/cu. ft. nominal density.
2. Mineral-Fiber Board: 2 inches thick and 3-lb/cu. ft. nominal density.
3. Phenolic: 2 inches thick.

### 3.19 EQUIPMENT INSULATION SCHEDULE

A. Insulation materials and thicknesses are identified below. If more than one material is listed for a type of equipment, selection from materials listed is Contractor's option.

B. Insulate indoor and outdoor equipment in paragraphs below that is not factory insulated.

C. Chilled-water pump insulation shall be one of the following:

1. Cellular Glass: 3 inches thick.
2. Mineral-Fiber Board: 2 inches thick and 3-lb/cu. ft. nominal density.

D. Heating-hot-water pump insulation shall be one of the following:

1. Calcium Silicate: 3 inches thick.
2. Cellular Glass: 3 inches thick.
3. Mineral-Fiber Board: 2 inches thick and 6-lb/cu. ft. nominal density.

### 3.20 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

### 3.21 INDOOR PIPING INSULATION SCHEDULE

- A. Chilled Water and Brine, above 40 Deg F :

- 1. NPS 3 and Smaller: Insulation shall be the following:
  - a. Cellular Glass: 1-1/2 inchesthick.
  - b. Mineral-Fiber, Preformed Pipe, Type I 1-1/2 inches thick.
  - c. Polyisocyanurate: 1-1/2 inches thick.

- B. Heating-Hot-Water Supply and Return, 200 Deg F and below:

- 1. NPS 12 and Smaller: Insulation shall be the following:
  - a. Cellular Glass: 2 inches thick.
  - b. Mineral-Fiber, Preformed Pipe, Type I: 2 inches thick.
  - c. Polyisocyanurate: 1-1/2 inches thick.

- C. Refrigerant Suction and Hot-Gas Piping:

- 1. All Pipe Sizes: Insulation shall bethe following:
  - a. Cellular Glass: 1-1/2 inches thick.
  - b. Flexible Elastomeric: 1 inch thick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
  - d. Polyisocyanurate: 1 inch thick.

### 3.22 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

- A. Refrigerant Suction and Hot-Gas Piping:

- 1. All Pipe Sizes: Insulation shall be the following:
  - a. Cellular Glass: 2 inches (50 mm) thick.
  - b. Flexible Elastomeric: 2 inches (50 mm) thick.
  - c. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches (50 mm) thick.
  - d. Polyisocyanurate: 2 inches (50 mm) thick.

### 3.23 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts and Plenums, Concealed:

1. None.
2. PVC, Color-Coded by System: 20 mils 30 mils thick.
3. Painted Aluminum, Smooth: 0.016 inch 0.020 inch thick.

D. Ducts and Plenums, Exposed:

1. None.
2. PVC, Color-Coded by System: 20 mils 30 mils thick.
3. Painted Aluminum, Smooth 0.016 inch thick.

E. Equipment, Concealed:

1. None.
2. PVC, Color-Coded by System: 20 mils thick.
3. Painted Aluminum, Smooth: 0.016 inch 0.020 inch 0.024 inch 0.032 inch thick.

F. Equipment, Exposed, up to 48 Inches in Diameter or with Flat Surfaces up to 72 Inches:

1. None.
2. PVC, Color-Coded by System: 20 mils thick.
3. Painted Aluminum, Smooth: 0.016 inch thick.

G. Equipment, Exposed, Larger Than 48 Inches in Diameter or with Flat Surfaces Larger Than 72 Inches:

1. None.
2. Painted Aluminum, with 1-1/4 Inch.

H. Piping, Concealed:

1. None.
2. PVC, Color-Coded by System: 20 mils thick.
3. Painted Aluminum, Smooth: 0.016 inch thick.

I. Piping, Exposed:

1. None.
2. PVC, Color-Coded by System: 20 milst thick.
3. Painted Aluminum, Smooth: 0.016 inch 0.020 inch 0.024 inch 0.032 inch thick.

3.24 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Ducts and Plenums, Concealed:
  1. None.
  2. PVC: 20 mils 30 mils thick.

- D. Ducts and Plenums, Exposed, up to 48 Inches in Diameter or with Flat Surfaces up to 72 Inches:
  - 1. Aluminum, Smooth: 0.016 inch 0.020 inch, 0.024 inch 0.032 inch 0.040 inch thick.
- E. Ducts and Plenums, Exposed, Larger Than 48 Inches in Diameter or with Flat Surfaces Larger Than 72 Inches:
  - 1. Aluminum, with 1-1/4 Inch.
- F. Equipment, Concealed:
  - 1. None.
  - 2. PVC: 20 mils 30 mils thick.
  - 3. Aluminum, Smooth: 0.016 inch 0.020 inch 0.024 inch 0.032 inch 0.040 inch thick.
- G. Equipment, Exposed, up to 48 Inches in Diameter or with Flat Surfaces up to 72 Inches:
  - 1. Painted Aluminum, with Z-Shaped Locking Seam: 0.016 inch 0.020 inch 0.024 inch 0.032 inch 0.040 inch thick.
- H. Equipment, Exposed, Larger Than 48 Inches in Diameter or with Flat Surfaces Larger Than 72 Inches:
  - 1. Painted Aluminum, with 1-1/4 Inch.
- I. Piping, Concealed:
  - 1. None.
  - 2. PVC, Color-Coded by System: 20 mils thick.
  - 3. Painted Aluminum, Smooth, 0.016 inch thick.
- J. Piping, Exposed:
  - 1. Painted Aluminum, with Z-Shaped Locking Seam: 0.016 inch

END OF SECTION 230700

## SECTION 230900

### AUTOMATIC TEMPERATURE CONTROL AND SEQUENCE OF OPERATIONS

#### PART 1 - GENERAL

- 1.1 General requirements for Automatic Temperature Control
- A. Provide a complete and operational temperature control system based on the sequence of operation. The system shall be complete as to sequences and standard control practices. The points are required to meet the sequence of operation shall be provided regardless of specific indication of the points, safeties, or manufacturer provided controls.
  - B. Control wiring shall conform to the requirements of NFPA 70, and the written requirements of the equipment and controls parts manufacturer.
- 1.2 Related Sections which shall be referenced and complied with
- A. 271000 – NYPL Communications Cabling
  - B. 270528 – NYPL Communications Pathways
  - C. 260519 – Low Voltage Electrical Power Conductors and Cables
  - D. 260533 – Raceway and Boxes for Electrical Systems
  - E. 260500 – Common Work Results for Electrical
  - F. 230110 – Basic Mechanical.
- 1.3 Submittal requirements
- A. The controls contractor shall provide complete pseudocode sequences of operation based on the general sequences of operation within the specifications including all safeties, interlock conditions, reset schedules and means for modulation or learning.
  - B. The controls contractor shall provide wiring diagrams for all control wiring and communication wiring between the thermostats and the Honeywell Webstat controller and between the Webstat controller and the building Ethernet data network.
  - C. Finalized thermostat plan including mounting elevation (thermostats shall not be mounted in contradiction of ADA requirements).

#### PART 2 - PRODUCTS

- 2.1 PROPRIETARY EQUIPMENT
- A. HONEYWELL WEBSTAT EQUIPMENT INCLUDES THERMOSTATS AND FACILITY COMMUNICATION MANAGER/CONTROLLER IS PROPRIETARY EQUIPMENT NOTED IN THE SCHEDULE OF PROPRIETARY EQUIPMENT. THIS EQUIPMENT (AND ALL OTHER EQUIPMENT) SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S AND MANUFACTURER'S REPRESENTATIVE'S WRITTEN REQUIREMENTS.

## 2.2 Digital time switches

- A. Digital time switches shall be capable of directly connecting and disconnecting the driven motor loads or shall be paired with the appropriate starter and provided with appropriate enclosures and wiring for the mounting location. Time switches shall be one of the following
  1. Tork E100P series
  2. Intermatic ET1100 series
  3. Sylvania SA300
  4. Approved equal suitable to driven equipment and installation location.
- B. Motor starters shall be rated NEMA 3 for outdoor installation and NEMA 1 for indoor installation, include hands-off-auto switch and overcurrent protection. One of the following manufacturers shall be used.
  1. SQUARE D
  2. Siemens
  3. CERUS
  4. AEG
  5. Approved equal

## PART 3 - EXECUTION

### 3.1 General wiring and panel installation requirements.

- A. All outdoor and wet location installations shall utilize rigid conduit with flexible watertight conduits for final equipment connections and NEMA-3 and NEMA-4 enclosures as appropriate.
- B. Wiring which cannot be concealed in a ceiling shall be run within EMT.
- C. Control wiring shall conform to the requirements of NFPA 70, and the written requirements of the equipment and controls parts manufacturer.
- D.

### 3.2 Webstat Thermostats

- A. RTU thermostats shall be Honeywell T7350 series with web interface kit for further interface to NYPL central monitoring systems. The existing NYPL system uses proprietary communication over the Lon Talk protocol and IP and only compatible equipment such as Honeywell T7350 shall be used.
- B. A first stage call for heat shall start the existing zone pump for perimeter heating
- C. With no call for cooling the modulating gas heat in the rooftop unit shall maintain a discharge air setpoint of 68°F (adj 65-72)
- D. A second stage call for heat shall call the first stage of heat in the rooftop unit
- E. A third stage call for heat shall call the second stage of heat in the rooftop unit
- F. The economizer controls of the thermostat shall not be used. Economizer control
- G. The contractor shall fully program the NYPL's occupancy schedule and, heating, cooling, occupied and unoccupied set point requirements into the thermostat and connect the thermostat to the NYPL's central monitoring facility.

### 3.3 RTU-1 and 2

- A. The following sequence shall be implemented by the factory mounted digital controls for RTU-1 and 2 as interfaced to a Honeywell Webstat thermostat over standard 24V thermostat communication.
- B. Economizer
  - 1. On any call for cooling when the OA temperature is less than 69°F, economizer mode shall be enabled.
  - 2. Compressors operation shall be locked out when OA temperature is less than 60°F.
- C. Occupied
  - 1. Supply fan runs continuously.
  - 2. Exhaust fan runs continuously.
  - 3. On a first stage call for heat (unit W1 wired to thermostat W2) from the thermostat or sensing a mixed air temperature of less than 55°F the modulating gas furnace shall modulate to maintain a supply air temperature of 78°F (adj).
  - 4. On a second stage call for heat (unit W2 to thermostat's W3) the modulating gas furnace shall maintain a discharge air temperature of 90°F.
  - 5. On a first stage call for cooling the mixed air duct stat call for heat shall be locked out and the economizer and first stage compressor shall operate in sequence to meet the first stage call for cooling.
  - 6. On a second stage call for cooling the economizer, the first compressor and the second compressor shall operate in sequence to meet the call for cooling.
  - 7. During compressor operation the condenser fans shall run to maintain the discharge pressure set point.
  - 8. When not in economizer mode the OA damper minimum position shall be reset to maintain space CO<sub>2</sub> between 400 and 700ppm.
  - 9. Provide visible notice at CO<sub>2</sub> sensors if CO<sub>2</sub> is more than 770 ppm.
- D. Unoccupied
  - 1. Cycle fan with calls for cooling and heating which shall be satisfied as above
  - 2. Outside air and exhaust dampers remain closed
- E. Safeties
  - 1. Power open FSDs and prove position prior to starting supply fan. Close dampers when supply fan stops.
  - 2. Prove air flow prior to furnace or compressors
  - 3. Shut down on signal from FAS/smoke detector
  - 4. Shut down on 38°F supply air freeze stat (manual reset).

### 3.4 HV-B-1

- A. All times
  - 1. Run fan continuously
  - 2. When OA temperature falls below 60°F start pump P-HV-B-1 and modulate coil control valve to maintain supply air temperature of 70°F
  - 3. If space temperature drops below 60°F (adj) modulate valve to maintain supply air temperature at 95°F.
- B. Safeties
  - 1. Power open FSDs and prove position prior to starting supply fan. Close dampers when supply fan stops.

2. Shut down on signal from FAS/smoke detector
3. Shut down and close damper on 38°F supply air freeze stat (manual reset).
4. Shut down and close damper on on 38°F return water (manual reset)
5. Audible alarm on freeze stats.

3.5 Miscellaneous Equipment

- A. CUH-1 All times
  1. Cycle fan to maintain space temperature above 68°F adjacent to exterior door. Thermostat shall be electronic, quick responding. Run pump P-CUH-1 on calls for heat.
- B. EF-B-1
  1. Run continuously
- C. EF-B-2
  1. Run when building is occupied. Provide digital time switch to schedule start/stop of fan.
- D. EF-R-1
  1. Run when building is occupied. Provide digital time switch to schedule start/stop of fan.

END OF SECTION 230900

## SECTION 230993

### SEQUENCE OF OPERATIONS

#### PART 1 - GENERAL

##### 1.1 SEQUENCE OF OPERATIONS

- A. Provide a complete and operational temperature control system based on the sequence of operation. The system shall be complete as to sequences and standard control practices. The points are required to meet the sequence of operation shall be provided regardless of specific indication of the points.
- B. The controls contractor shall provide complete pseudocode sequences of operation based on the general sequences of operation within the specifications including all safeties, interlock conditions, reset schedules and means for modulation or learning.
- C. The controls contractor shall provide wiring diagrams for all control wiring and communication wiring between the thermostats and the Honeywell Webstat controller and between the Webstat controller and the

##### 1.2 Webstat Thermostats

- A. RTU thermostats shall be Honeywell T7350 series with web interface kit for further interface to NYPL central monitoring systems. The existing NYPL system uses proprietary communication over the LonTalk protocol and IP and only compatible equipment such as Honeywell T7350 shall be used.
- B. A first stage call for heat shall start the existing perimeter heating zone pump
- C. With no call for cooling the modulating gas heat in the rooftop unit shall maintain a discharge air setpoint of 68°F (adj 65-72)
- D. A second stage call for heat shall call the first stage of heat in the rooftop unit
- E. A third stage call for heat shall call the second stage of heat in the rooftop unit
- F. The economizer controls of the thermostat shall not be used. Economizer control.
- G. The contractor shall fully program the NYPL's occupancy schedule and, heating, cooling, occupied and unoccupied set point requirements into the thermostat and connect the thermostat to the NYPL's central monitoring facility.

##### 1.3 RTU-1 and 2

- A. The following sequence shall be implemented by the factory mounted digital controls for RTU-1 and 2 as interfaced to a Honeywell Webstat thermostat over standard 24V thermostat communication.
- B. Economizer
  - 1. On any call for cooling when the OA temperature is less than 69°F, economizer mode shall be enabled.
  - 2. Compressors operation shall be locked out when OA temperature is less than 60°F.
- C. Occupied

1. Supply fan runs continuously.
2. Exhaust fan runs continuously.
3. On a first stage call for heat (unit W1 wired to thermostat W2) from the thermostat or sensing a mixed air temperature of less than 55°F the modulating gas furnace shall modulate to maintain a supply air temperature of 78°F (adj).
4. On a second stage call for heat (wire W2 to thermostat's W3) the modulating gas furnace shall maintain a discharge air temperature of 90°F.
5. On a first stage call for cooling the mixed air duct stat call for heat shall be locked out and the economizer and first stage compressor shall operate in sequence to meet the first stage call for cooling.
6. On a second stage call for cooling the economizer, the first compressor and the second compressor shall operate in sequence to meet the call for cooling.
7. During compressor operation the condenser fans shall run to maintain the discharge pressure set point.
8. When not in economizer mode the OA damper minimum position shall be reset to maintain space CO<sub>2</sub> between 400 and 700ppm.
9. Provide visible notice at CO<sub>2</sub> sensors if CO<sub>2</sub> is more than 770 ppm.

D. Unoccupied

1. Cycle fan with calls for cooling and heating which shall be satisfied as above
2. Outside air and exhaust dampers remain closed

E. Safeties

1. Power open FSDs and prove position prior to starting supply fan. Close dampers when supply fan stops.
2. Prove air flow prior to furnace or compressors
3. Shut down on signal from FAS/smoke detector
4. Shut down on 38°F supply air freeze stat (manual reset).

1.4 HV-B-1

A. All times

1. Run fan continuously
2. When OA temperature falls below 60°F start pump P-HV-B-1 and modulate coil control valve to maintain supply air temperature of 70°F
3. If space temperature drops below 60°F (adj) modulate valve to maintain supply air temperature at 95°F.

B. Safeties

1. Power open FSDs and prove position prior to starting supply fan. Close dampers when supply fan stops.
2. Shut down on signal from FAS/smoke detector
3. Shut down and close damper on 38°F supply air freeze stat (manual reset).
4. Shut down and close damper on on 38°F return water (manual reset)
5. Audible alarm on freeze stats.

1.5 Miscellaneous Equipment

A. CUH-1 All times

1. Cycle fan to maintain space temperature above 68°F adjacent to exterior door. Thermostat shall be electronic, quick responding. Run pump P-CUH-1 on calls for heat.

B. EF-B-1

1. Run continuously

- C. EF-B-2
  - 1. Run when building is occupied
- D. EF-R-1
  - 1. Run when building is occupied.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 230993

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SECTION 231123  
FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Pipes, tubes, and fittings.
  - 2. Piping specialties.
  - 3. Piping and tubing joining materials.
  - 4. Valves.
  - 5. Mechanical sleeve seals.
  - 6. Grout.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
  - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
- B. Natural-Gas System Pressure within Buildings: 0.5 psig or less More than 0.5 psig but not more than 2 psig More than 2 psig but not more than 5 psig.
- C. Delegated Design: Design restraints and anchors for natural-gas piping and equipment, including comprehensive engineering analysis by a qualified professional Commissioner, using performance requirements and design criteria indicated.

## 1.5 SUBMITTALS

- A. Product Data: For each type of the following:
  - 1. Piping specialties.
  - 2. Corrugated, stainless-steel tubing with associated components.
  - 3. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
  - 4. fittings and meter bars meter bars supports.
  - 5. Dielectric fittings.
  - 6. Mechanical sleeve seals.
  - 7. Escutcheons.
- B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
  - 1. Shop Drawing Scale: 1/4 inch per foot.
  - 2. Detail mounting, supports, and valve arrangements for service meter assembly and pressure regulator assembly.
- C. Delegated-Design Submittal: For natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of seismic restraints.
  - 2. Design Calculations: Calculate requirements for selecting seismic restraints.
- D. Coordination Drawings: Plans and details, drawn to scale, on which natural-gas piping is shown and coordinated with other installations, using input from installers of the items involved.
- E. Site Survey: Plans, drawn to scale, on which natural-gas piping is shown and coordinated with other services and utilities.
- F. Qualification Data: For qualified professional engineer.
- G. Welding certificates.
- H. Field quality-control reports.
- I. Operation and Maintenance Data: For motorized gas valves pressure regulators and service meters to include in emergency, operation, and maintenance manuals.

## 1.6 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

## 1.8 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by The City of New York or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
  - 1. Notify Commissioner no fewer than two days in advance of proposed interruption of natural-gas service.
  - 2. Do not proceed with interruption of natural-gas service without Commissioner's written permission.

## 1.9 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.
- B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Division 08 Section "Access Doors and Frames."

## PART 2 - PRODUCTS

### 2.1 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
  - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
  - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
  - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
  - 4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

- a. Material Group: 1.1.
  - b. End Connections: Threaded or butt welding to match pipe.
  - c. Lapped Face: Not permitted underground.
  - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
  - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.
5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
- a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
6. Mechanical Couplings:
- a. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) Dresser Piping Specialties; Division of Dresser, Inc.
    - 2) Smith-Blair, Inc.
  - b. Stainless-steel Steel flanges and tube with epoxy finish.
  - c. Buna-nitrile seals.
  - d. Stainless-steel Steel bolts, washers, and nuts.
  - e. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
  - f. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

## 2.2 PIPING SPECIALTIES

### A. Appliance Flexible Connectors:

- 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
- 2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
- 3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
- 4. Corrugated stainless-steel tubing with polymer coating.
- 5. Operating-Pressure Rating: 0.5 psig.
- 6. End Fittings: Zinc-coated steel.
- 7. Threaded Ends: Comply with ASME B1.20.1.
- 8. Maximum Length: 72 inches.

### B. Quick-Disconnect Devices: Comply with ANSI Z21.41.

- 1. Copper-alloy convenience outlet and matching plug connector.
- 2. Nitrile seals.
- 3. Hand operated with automatic shutoff when disconnected.
- 4. For indoor or outdoor applications.
- 5. Adjustable, retractable restraining cable.

### C. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

## 2.3 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for natural gas.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

## 2.4 MANUAL GAS SHUTOFF VALVES

- A. See "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
  - 1. CWP Rating: 125 psig .
  - 2. Threaded Ends: Comply with ASME B1.20.1.
  - 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
  - 4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  - 5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
  - 6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with ASME B16.38.
  - 1. CWP Rating: 125 psig .
  - 2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
  - 3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  - 4. Service Mark: Initials "WOG" shall be permanently marked on valve body.
- D. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BrassCraft Manufacturing Company; a Masco company.
    - b. Conbraco Industries, Inc.; Apollo Div.
    - c. Lyall, R. W. & Company, Inc.
    - d. McDonald, A. Y. Mfg. Co.
    - e. Perfection Corporation; a subsidiary of American Meter Company.
  - 2. Body: Bronze, complying with ASTM B 584.
  - 3. Ball: Chrome-plated brass.
  - 4. Stem: Bronze; blowout proof.
  - 5. Seats: Reinforced TFE; blowout proof.
  - 6. Packing: Separate packnut with adjustable-stem packing threaded ends.

7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  8. CWP Rating: 600 psig.
  9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- E. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BrassCraft Manufacturing Company; a Masco company.
    - b. Conbraco Industries, Inc.; Apollo Div.
    - c. Lyall, R. W. & Company, Inc.
    - d. McDonald, A. Y. Mfg. Co.
    - e. Perfection Corporation; a subsidiary of American Meter Company.
  2. Body: Bronze, complying with ASTM B 584.
  3. Ball: Chrome-plated bronze.
  4. Stem: Bronze; blowout proof.
  5. Seats: Reinforced TFE; blowout proof.
  6. Packing: Threaded-body packnut design with adjustable-stem packing.
  7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  8. CWP Rating: 600 psig.
  9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- F. Two-Piece, Regular-Port Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BrassCraft Manufacturing Company; a Masco company.
    - b. Conbraco Industries, Inc.; Apollo Div.
    - c. Lyall, R. W. & Company, Inc.
    - d. McDonald, A. Y. Mfg. Co.
    - e. Perfection Corporation; a subsidiary of American Meter Company.
  2. Body: Bronze, complying with ASTM B 584.
  3. Ball: Chrome-plated bronze.
  4. Stem: Bronze; blowout proof.
  5. Seats: Reinforced TFE.
  6. Packing: Threaded-body packnut design with adjustable-stem packing.
  7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  8. CWP Rating: 600 psig.
  9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

G. Bronze Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Lee Brass Company.
  - b. McDonald, A. Y. Mfg. Co.
2. Body: Bronze, complying with ASTM B 584.
3. Plug: Bronze.
4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Operator: Square head or lug type with tamperproof feature where indicated.
6. Pressure Class: 125 psig.
7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

H. Cast-Iron, Nonlubricated Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. McDonald, A. Y. Mfg. Co.
  - b. Mueller Co.; Gas Products Div.
  - c. Xomox Corporation; a Crane company.
2. Body: Cast iron, complying with ASTM A 126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

I. Cast-Iron, Lubricated Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Flowserve.
  - b. Homestead Valve; a division of Olson Technologies, Inc.
  - c. McDonald, A. Y. Mfg. Co.
  - d. Milliken Valve Company.
  - e. Mueller Co.; Gas Products Div.
  - f. R&M Energy Systems, A Unit of Robbins & Myers, Inc.
2. Body: Cast iron, complying with ASTM A 126, Class B.

3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

J. PE Ball Valves: Comply with ASME B16.40.

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Kerotest Manufacturing Corp.
  - b. Lyall, R. W. & Company, Inc.
  - c. Perfection Corporation; a subsidiary of American Meter Company.
2. Body: PE.
3. Ball: PE.
4. Stem: Acetal.
5. Seats and Seals: Nitrile.
6. Ends: Plain or fusible to match piping.
7. CWP Rating: 80 psig .
8. Operating Temperature: Minus 20 to plus 140 deg F.
9. Operator: Nut or flat head for key operation.
10. Include plastic valve extension.
11. Include tamperproof locking feature for valves where indicated on Drawings.

2.5 DIELECTRIC FITTINGS

A. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Capitol Manufacturing Company.
  - b. Central Plastics Company.
  - c. Hart Industries International, Inc.
  - d. McDonald, A. Y. Mfg. Co.
  - e. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
  - f. Wilkins; Zurn Plumbing Products Group.
2. Minimum Operating-Pressure Rating: 150 psig .
3. Combination fitting of copper alloy and ferrous materials.
4. Insulating materials suitable for natural gas.
5. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

B. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Capitol Manufacturing Company.
  - b. Central Plastics Company.
  - c. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
  - d. Wilkins; Zurn Plumbing Products Group.
2. Minimum Operating-Pressure Rating: 150 psig .
3. Combination fitting of copper alloy and ferrous materials.
4. Insulating materials suitable for natural gas.
5. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

C. Dielectric-Flange Kits:

1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Advance Products & Systems, Inc.
  - b. Calpico Inc.
  - c. Central Plastics Company.
  - d. Pipeline Seal and Insulator, Inc.
2. Minimum Operating-Pressure Rating: 150 psig .
3. Companion-flange assembly for field assembly.
4. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or PE bolt sleeves, phenolic washers, and steel backing washers.
5. Insulating materials suitable for natural gas.
6. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

2.6 SLEEVES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.7 ESCUTCHEONS

- A. General Requirements for Escutcheons: Manufactured wall and ceiling escutcheons and floor plates, with ID to fit around pipe or tube, and OD that completely covers opening.
- B. One-Piece, Deep-Pattern Escutcheons: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Escutcheons: With set screw.
  1. Finish: Polished chrome-plated Rough brass Polished chrome-plated or rough brass.

- D. Split-Casting, Cast-Brass Escutcheons: With concealed hinge and set screw.
  - 1. Finish: Polished chrome-plated Rough brass Polished chrome-plated or rough brass.
- E. One-Piece, Stamped-Steel Escutcheons: With set screw spring clips set screw or spring clips and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Escutcheons: With concealed exposed-rivet hinge, set screw spring clips set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Escutcheons: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Escutcheons: Cast brass with concealed hinge and set screw.

## 2.8 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post-hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.
  - 3. Packaging: Premixed and factory packaged.

## 2.9 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural-gas piping according to NFPA 54 the International Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.
- C. Comply with NFPA 54 the International Fuel Gas Code requirements for prevention of accidental ignition.

### 3.3 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 the International Fuel Gas Code for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Install escutcheons at penetrations of interior walls, ceilings, and floors.
  - 1. New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    - c. Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
    - d. Piping at Ceiling Penetrations in Finished Spaces: One-piece Split-casting One-piece or split-casting, cast-brass type with polished chrome-plated finish.
    - e. Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type Split-plate, stamped-steel type with concealed hinge One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge and set screw.
    - f. Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated rough-brass finish.
    - g. Piping in Unfinished Service Spaces: One-piece, stamped-steel type with set screw spring clips set screw or spring clips.
    - h. Piping in Equipment Rooms: One-piece, cast-brass type.
    - i. Piping in Equipment Rooms: One-piece, stamped-steel type with set screw spring clips set screw or spring clips.
    - j. Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

- L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- M. Verify final equipment locations for roughing-in.
- N. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- O. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
  - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- P. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- Q. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
- R. Concealed Location Installations: Except as specified below, install concealed natural-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.
  - 1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
  - 2. In Floors: Install natural-gas piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1-1/2 inches of concrete. Piping may not be in physical contact with other metallic structures such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate.
  - 3. In Floor Channels: Install natural-gas piping in floor channels. Channels must have cover and be open to space above cover for ventilation.
  - 4. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.
    - a. Exception: Tubing passing through partitions or walls does not require striker barriers.
  - 5. Prohibited Locations:
    - a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
    - b. Do not install natural-gas piping in solid walls or partitions.
- S. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- T. Connect branch piping from top or side of horizontal piping.

- U. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.
- V. Do not use natural-gas piping as grounding electrode.
- W. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- X. Install pressure gage downstream upstream and downstream from each line regulator. Pressure gages are specified in Division 23 Section "Meters and Gages for HVAC Piping."

### 3.4 SERVICE-METER ASSEMBLY INSTALLATION

- A. Install service-meter assemblies aboveground, on concrete bases.
- B. Install metal shutoff valves upstream from service regulators. Shutoff valves are not required at second regulators if two regulators are installed in series.
- C. Install strainer on inlet of service-pressure regulator and meter set.
- D. Install service regulators mounted outside with vent outlet horizontal or facing down. Install screen in vent outlet if not integral with service regulator.
- E. Install metal shutoff valves upstream from service meters. Install dielectric fittings downstream from service meters.
- F. Install service meters downstream from pressure regulators.
- G. Install metal bollards to protect meter assemblies. Comply with requirements in Division 05 Section "Metal Fabrications" for pipe bollards.

### 3.5 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.
- B. Install underground valves with valve boxes.
- C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
- D. Install earthquake valves aboveground outside buildings according to listing.
- E. Install anode for metallic valves in underground PE piping.

### 3.6 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:

1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.

G. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

H. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

### 3.7 CONNECTIONS

A. Connect to utility's gas main according to utility's procedures and requirements.

B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

C. Install piping adjacent to appliances to allow service and maintenance of appliances.

D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

### 3.8 PAINTING

- A. Comply with requirements in Division 09 painting Sections for painting interior and exterior natural-gas piping.
- B. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
  - 1. Alkyd System: MPI EXT 5.1D.
    - a. Prime Coat: Alkyd anticorrosive metal primer.
    - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
    - c. Topcoat: Exterior alkyd enamel (flat) (semigloss) (gloss).
    - d. Color: Gray.
- C. Paint exposed, interior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
  - 1. Latex Over Alkyd Primer System: MPI INT 5.1Q.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex (flat) (low sheen) (eggshell) (satin) (semigloss) (gloss).
    - d. Color: Gray.
  - 2. Alkyd System: MPI INT 5.1E.
    - a. Prime Coat: Alkyd anticorrosive Quick-drying alkyd metal primer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd (flat) (eggshell) (semigloss) (gloss).
    - d. Color: Gray.
- D. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

### 3.9 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Test, inspect, and purge natural gas according to NFPA 54 the International Fuel Gas Code and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train The City of New York 's maintenance personnel to adjust, operate, and maintain earthquake valves.

3.11 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG

- A. Aboveground, branch piping NPS 1 and smaller shall be one of the following:
  - 1. Corrugated stainless-steel tubing with mechanical fittings having socket or threaded ends to match adjacent piping.
  - 2. Annealed-temper, tin-lined copper tube with flared joints and fittings.
  - 3. Annealed-temper, copper tube with wrought-copper fittings and brazed flared joints.
  - 4. Aluminum tube with flared fittings and joints.
  - 5. Steel pipe with malleable-iron fittings and threaded joints.
- B. Aboveground, distribution piping shall be one of the following:
  - 1. Steel pipe with malleable-iron fittings and threaded joints.
  - 2. Steel pipe with wrought-steel fittings and welded joints.
  - 3. Drawn-temper copper tube with wrought-copper fittings and brazed joints.
- C. Underground, below building, piping shall be one of the following:
  - 1. Steel pipe with malleable-iron fittings and threaded joints.
  - 2. Steel pipe with wrought-steel fittings and welded joints.
- D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
- E. Containment Conduit Vent Piping: Steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

END OF SECTION 231123

SECTION 232123

HYDRONIC PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Wet-rotor pumps.
  - 2. Automatic condensate pump units.

1.3 DEFINITIONS

- A. Buna-N: Nitrile rubber.
- B. EPT: Ethylene propylene terpolymer.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of pump. Include certified performance curves and rated capacities, operating characteristics, furnished specialties, final impeller dimensions, and accessories for each type of product indicated. Indicate pump's operating point on curves.
- B. Shop Drawings: For each pump.
  - 1. Show pump layout and connections.
  - 2. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.
  - 3. Include diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pumps to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Mechanical Seals: One mechanical seal(s) for each pump.

## PART 2 - PRODUCTS

### 2.1 WET-ROTOR PUMPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - 1. Armstrong Pumps Inc.
  - 2. Grundfos Pumps Corporation.
  - 3. ITT Corporation; Bell & Gossett.
  - 4. TACO Incorporated.
- C. Description: Factory-assembled and -tested, wet-rotor pump.
- D. Pump Construction:
  - 1. Body: 100 percent lead-free bronze Cast iron.
  - 2. Impeller: Polypropylene.
  - 3. Pump Shaft: Ceramic.
  - 4. Bearings. Double-sintered carbon.
- E. Motor: Three speed.
  - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
    - a. Efficiency: Premium efficient.
    - b. NEMA I
    - c. Service Factor: 1.15

### 2.2 AUTOMATIC CONDENSATE PUMP UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - 1. Beckett Corporation.
  - 2. Hartell Pumps Div.; Milton Roy Co.
  - 3. Little Giant Pump Co.
  - 4. Mepco, LLC.
  - 5. Federal Pumps. Co.
- C. Description: Packaged units with corrosion-resistant pump, plastic tank with cover, and automatic controls. Include factory- or field-installed check valve and a 72-inch- minimum, electrical power cord with plug.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine equipment foundations and anchor-bolt locations for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before pump installation.
- C. Examine foundations and inertia bases for suitable conditions where pumps are to be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PUMP INSTALLATION

- A. Comply with HI 1.4.
- B. Install pumps to provide access for periodic maintenance including removing motors, impellers, couplings, and accessories.
- C. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.
- D. Automatic Condensate Pump Units: Install units for collecting condensate and extend to open drain.
- E. Equipment Mounting: Install base-mounted pumps on cast-in-place concrete equipment bases. Comply with requirements for equipment bases specified in Section 033000 "Cast-in-Place Concrete." Section 033053 "Miscellaneous Cast-in-Place Concrete."
  - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
  - 2. Construct bases to withstand, without damage to equipment, seismic force required by code.
  - 3. Construct concrete bases 6 inches high and extend base not less than 6 inches in all directions beyond the maximum dimensions of base-mounted pumps unless otherwise indicated or unless required for seismic-anchor support.
  - 4. Minimum Compressive Strength: 3000 psi at 28 days.
- F. Equipment Mounting: Install in-line pumps with continuous-thread hanger rods and spring hangers with vertical-limit stop of size required to support weight of in-line pumps.
  - 1. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."
  - 2. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

### 3.3 ALIGNMENT

- A. Engage a factory-authorized service representative to perform alignment service.
- B. Comply with requirements in Hydronics Institute standards for alignment of pump and motor shaft. Add shims to the motor feet and bolt motor to base frame. Do not use grout between motor feet and base frame.
- C. Comply with pump and coupling manufacturers' written instructions.

- D. After alignment is correct, tighten foundation bolts evenly but not too firmly. Completely fill baseplate with nonshrink, nonmetallic grout while metal blocks and shims or wedges are in place. After grout has cured, fully tighten foundation bolts.

### 3.4 CONNECTIONS

- A. Comply with requirements for piping specified in Section 232213 "Steam and Condensate Heating Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to pump, allow space for service and maintenance.
- C. Connect piping to pumps. Install valves that are same size as piping connected to pumps.
- D. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.
- E. Install triple-duty valve on discharge side of pumps.
- F. Install suction diffuser and shutoff valve on suction side of pumps.
- G. Install flexible connectors on suction and discharge sides of base-mounted pumps between pump casing and valves.
- H. Install pressure gages on pump suction and discharge or at integral pressure-gage tapping, or install single gage with multiple-input selector valve.
- I. Install check valve and gate or ball valve on each condensate pump unit discharge.
- J. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- K. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### 3.5 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Check piping connections for tightness.
  - 3. Clean strainers on suction piping.
  - 4. Perform the following startup checks for each pump before starting:
    - a. Verify bearing lubrication.
    - b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
    - c. Verify that pump is rotating in the correct direction.
  - 5. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
  - 6. Start motor.
  - 7. Open discharge valve slowly.

### 3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train The City of New York's maintenance personnel to adjust, operate, and maintain hydronic pumps.

END OF SECTION 232123

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## SECTION 233113

### METAL DUCTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Sheet metal materials.
3. Duct liner.
4. Sealants and gaskets.
5. Hangers and supports.
6. Seismic-restraint devices.

- B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

- B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity[ and seismic] loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

1. Seismic Hazard Level A: Seismic force to weight ratio, 0.48.
2. Seismic Hazard Level B: Seismic force to weight ratio, 0.30.
3. Seismic Hazard Level C: Seismic force to weight ratio, 0.15.

- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of the following products:

1. Liners and adhesives.
  2. Sealants and gaskets.
  3. Seismic-restraint devices.
- B. LEED Submittals:
1. Product Data for Prerequisite EQ 1: Documentation indicating that duct systems comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."
  2. Product Data for Prerequisite EA 2: Documentation indicating that duct systems comply with ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."
  3. Leakage Test Report for Prerequisite EA 2: Documentation of work performed for compliance with ASHRAE/IESNA 90.1-2004, Section 6.4.4.2.2 - "Duct Leakage Tests."
  4. Duct-Cleaning Test Report for Prerequisite EQ 1: Documentation of work performed for compliance with ASHRAE 62.1-2004, Section 7.2.4 - "Ventilation System Start-Up."
  5. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.
- C. Shop Drawings:
1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
  2. Factory- and shop-fabricated ducts and fittings.
  3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
  4. Elevation of top of ducts.
  5. Dimensions of main duct runs from building grid lines.
  6. Fittings.
  7. Reinforcement and spacing.
  8. Seam and joint construction.
  9. Penetrations through fire-rated and other partitions.
  10. Equipment installation based on equipment being used on Project.
  11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
  12. Hangers and supports, including methods for duct and building attachment, and vibration isolation.
- D. Delegated-Design Submittal:
1. Sheet metal thicknesses.
  2. Joint and seam construction and sealing.
  3. Reinforcement details and spacing.
  4. Materials, fabrication, assembly, and spacing of hangers and supports.
  5. Design Calculations: Calculations, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports.
- E. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
  2. Suspended ceiling components.
  3. Structural members to which duct will be attached.
  4. Size and location of initial access modules for acoustical tile.
  5. Penetrations of smoke barriers and fire-rated construction.

6. Items penetrating finished ceiling including the following:

- a. Lighting fixtures.
- b. Air outlets and inlets.
- c. Speakers.
- d. Sprinklers.
- e. Access panels.
- f. Perimeter moldings.

F. Welding certificates.

G. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
  - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
  - 3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."
- E. All qualification shall be provided to Construction manager and the owner for record and files.
- F. Mockups:
  - 1. Before installing duct systems, build mockups representing static-pressure classes in excess of 3-inch wg External Static Pressure. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
    - a. Five transverse joints.
    - b. One access door(s).
    - c. Two typical branch connections, each with at least one elbow.
    - d. Two typical flexible duct or flexible-connector connections for each duct and apparatus.
    - e. One 90-degree turn(s) with turning vanes.
    - f. Perform leakage tests specified in "Field Quality Control" Article. Revise mockup construction and perform additional tests as required to achieve specified minimum acceptable results.
  - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

### 2.2 SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Lindab Inc.
    - b. McGill AirFlow LLC.
    - c. SEMCO Incorporated.
    - d. Sheet Metal Connectors, Inc.
    - e. Spiral Manufacturing Co., Inc.
- B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  - 1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support

intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.

E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 G90.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

E. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

F. Factory- or Shop-Applied Antimicrobial Coating:

1. Apply to the surface of sheet metal that will form the interior surface of the duct. An untreated clear coating shall be applied to the exterior surface.
2. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Coating containing the antimicrobial compound shall have a hardness of 2H, minimum, when tested according to ASTM D 3363.
4. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
5. Shop-Applied Coating Color: Black.
6. Antimicrobial coating on sheet metal is not required for duct containing liner treated with antimicrobial coating.

G. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

- H. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## 2.4 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide imparable product by one of the following:

- a. CertainTeed Corporation; Insulation Group.
- b. Johns Manville. Permacote- Linacoustic
- c. Knauf Insulation.
- d. Owens Corning.
- e. Maximum Thermal Conductivity:

- 1) Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
- 2) Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.

3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems. Erosion coating shall be similar to Permacote by Johns Mansville or equal.

4. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

- a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Natural-Fiber Duct Liner: 85 percent cotton, 10 percent borate, and 5 percent polybinding fibers, treated with a microbial growth inhibitor and complying with NFPA 90A or NFPA 90B.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:

- a. Bonded Logic, Inc.
- b. Reflectix Inc.

3. Maximum Thermal Conductivity: 0.24 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature when tested according to ASTM C 518.

4. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to ASTM E 84; certified by an NRTL.

5. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
  - a. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, [0.106-inch-] [0.135-inch-] diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

D. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
  - a. Fan discharges.
  - b. Intervals of lined duct preceding unlined duct.
  - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
  - a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.
10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

## 2.5 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
  2. Tape Width: 4 inches
  3. Sealant: Modified styrene acrylic.
  4. Water resistant.
  5. Mold and mildew resistant.
  6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  7. Service: Indoor and outdoor.
  8. Service Temperature: Minus 40 to plus 200 deg F.
  9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
  10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Based Joint and Seam Sealant:
1. Application Method: Brush on.
  2. Solids Content: Minimum 65 percent.
  3. Shore A Hardness: Minimum 20.
  4. Water resistant.
  5. Mold and mildew resistant.
  6. VOC: Maximum 75 g/L (less water).
  7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  8. Service: Indoor or outdoor.
  9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C 920.
1. General: Single-component, acid-curing, silicone, elastomeric.
  2. Type: S.
  3. Grade: NS.
  4. Class: 25.
  5. Use: O.
  6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
- F. Round Duct Joint O-Ring Seals:
1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
  2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
  3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

## 2.6 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
  - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
  - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
  - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

## PART 3 - EXECUTION

### 3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round and flat-oval ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

### 3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

### 3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
  1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  2. Outdoor, Supply-Air Ducts: Seal Class A.
  3. Outdoor, Exhaust Ducts: Seal Class C.
  4. Outdoor, Return-Air Ducts: Seal Class C.
  5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
  6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
  7. Unconditioned Space, Exhaust Ducts: Seal Class C.
  8. Unconditioned Space, Return-Air Ducts: Seal Class B.

9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

### 3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
  1. Where practical, install concrete inserts before placing concrete.
  2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
  3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
  4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
  5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### 3.5 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems." ASCE/SEI 7.
  1. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
  2. Brace a change of direction longer than 12 feet.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.

- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
- G. Drilling for and Setting Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Commissioner if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
  - 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
  - 5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

### 3.6 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### 3.7 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

### 3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
  - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
  - 2. Test the following systems:
    - a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections, totaling no less than 25 percent of total installed duct area for each designated pressure class.
    - b. Supply Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, totaling no less than 50 percent of total installed duct area for each designated pressure class.

- c. Return Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, totaling no less than 50 percent of total installed duct area for each designated pressure class.
  - d. Exhaust Ducts with a Pressure Class of 3-Inch wg or Higher: Test representative duct sections, totaling no less than 50 percent of total installed duct area for each designated pressure class.
3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
  4. Test for leaks before applying external insulation.
  5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
  6. Give seven days' advance notice for testing.
- C. Duct System Cleanliness Tests:
1. Visually inspect duct system to ensure that no visible contaminants are present.
  2. Test sections of metal duct system, chosen randomly by City of New York , for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
    - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.
- D. Duct system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

### 3.9 DUCT CLEANING

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
  1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Air Duct Accessories" for access panels and doors.
  2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
  3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
  1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
  2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- D. Clean the following components by removing surface contaminants and deposits:
  1. Air outlets and inlets (registers, grilles, and diffusers).

2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.10 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.11 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

- B. Supply Ducts:

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units
  - a. Pressure Class: Positive 1-inch wg
  - b. Minimum SMACNA Seal Class: A
  - c. SMACNA Leakage Class for Rectangular: 12.
  - d. SMACNA Leakage Class for Round and Flat Oval: 12.
2. Ducts Connected to Constant-Volume Air-Handling Units:
  - a. Pressure Class: Positive 2-inch wg.
  - b. Minimum SMACNA Seal Class: A.

- c. SMACNA Leakage Class for Rectangular: 12.
- d. SMACNA Leakage Class for Round and Flat Oval: 12.

C. Return Ducts:

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:

- a. Pressure Class: Positive or negative 1-inch wg
- b. Minimum SMACNA Seal Class: A.
- c. SMACNA Leakage Class for Rectangular: 12.
- d. SMACNA Leakage Class for Round and Flat Oval: 12.

2. Ducts Connected to Air-Handling Units:

- a. Pressure Class: Positive or negative 2-inch wg.
- b. Minimum SMACNA Seal Class: A.
- c. SMACNA Leakage Class for Rectangular: 12.
- d. SMACNA Leakage Class for Round and Flat Oval: 6.

D. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

- a. Pressure Class: Negative 2-inch wg
- b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
- c. SMACNA Leakage Class for Rectangular: 12.
- d. SMACNA Leakage Class for Round and Flat Oval: 12.

2. Ducts Connected to Air-Handling Units:

- a. Pressure Class: Positive or negative 2-inch wg.
- b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
- c. SMACNA Leakage Class for Rectangular: 12.
- d. SMACNA Leakage Class for Round and Flat Oval: 12.

E. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:

- a. Pressure Class: Positive or negative 1-inch wg.
- b. Minimum SMACNA Seal Class: A.
- c. SMACNA Leakage Class for Rectangular: 12.
- d. SMACNA Leakage Class for Round and Flat Oval: 12.

F. Intermediate Reinforcement:

- 1. Galvanized-Steel Ducts: Galvanized steel Carbon steel coated with zinc-chromate primer Galvanized steel or carbon steel coated with zinc-chromate primer.
- 2. Aluminum Ducts: Aluminum:

G. Liner:

- 1. Supply Air Ducts: Fibrous glass, Type I Natural fiber, 1 inch
- 2. Return Air Ducts: Fibrous glass, Type I Natural fiber, 1 inch.

3. Exhaust Air Ducts:
4. Supply Fan Plenums: Fibrous glass, Type II Natural fiber, 1 inch
5. Return- and Exhaust-Fan Plenums: Fibrous glass, Type II Natural fiber, 2 inches
6. Transfer Ducts: Fibrous glass, Type I Natural fiber, 1 inch.

H. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
  - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
  - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

I. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
  - a. Rectangular Main to Rectangular Branch: 45-degree entry.
  - b. Rectangular Main to Round Branch: Spin in.
2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
  - a. Velocity 1000 fpm or Lower: 90-degree tap.
  - b. Velocity 1000 to 1500 fpm: Conical tap.
  - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 233113

SECTION 233300  
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Backdraft and pressure relief dampers.
2. Barometric relief dampers.
3. Manual volume dampers.
4. Control dampers.
5. Fire dampers.
6. Ceiling dampers.
7. Corridor dampers.
8. Flange connectors.
9. Duct silencers.
10. Turning vanes.
11. Remote damper operators.
12. Duct-mounted access doors.
13. Flexible connectors.
14. Flexible ducts.
15. Duct accessory hardware.

B. Related Sections:

1. Division 28 Section "Fire Detection and Alarm" for duct-mounted fire and smoke detectors.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

B. LEED Submittal:

1. Product Data for Prerequisite EQ 1: Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."

C. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

- a. Special fittings.
- b. Manual volume damper installations.
- c. Control damper installations.
- d. Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.
- e. Duct security bars.
- f. Wiring Diagrams: For power, signal, and control wiring.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.

E. Source quality-control reports.

F. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

#### 1.4 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with AMCA 500-D testing for damper rating.

#### 1.5 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60, G90.
2. Exposed-Surface Finish: Mill phosphatized.

C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and finish for exposed ducts.

- D. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
- F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## 2.2 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- A. Manufacturers: Subject to compliance with requirements:
  - 1. Air Balance Inc.; a division of Mestek, Inc.
  - 2. American Warming and Ventilating; a division of Mestek, Inc.
  - 3. Cesco Products; a division of Mestek, Inc.
  - 4. Duro Dyne Inc.
  - 5. Greenheck Fan Corporation.
  - 6. Lloyd Industries, Inc.
  - 7. Nailor Industries Inc.
  - 8. NCA Manufacturing, Inc.
  - 9. Pottorff; a division of PCI Industries, Inc.
  - 10. Ruskin Company.
  - 11. SEMCO Incorporated.
  - 12. Vent Products Company, Inc.
- B. Description: Gravity balanced.
- C. Maximum Air Velocity: 3000 fpm
- D. Maximum System Pressure: 2-inch wg.
- E. Frame: 0.052-inch- thick, galvanized sheet steel with welded corners and mounting flange.
- F. Blades: Multiple single-piece blades, center-pivoted, maximum 6-inch width, 0.025-inch with sealed edges.
- G. Blade Action: Parallel.
- H. Blade Seals: Neoprene, mechanically locked.
- I. Blade Axles:
  - 1. Material: Galvanized steel.
  - 2. Diameter: 0.20 inch
- J. Tie Bars and Brackets: Galvanized steel.
- K. Return Spring: Adjustable tension.
- L. Bearings: Steel ball
- M. Accessories:

1. Adjustment device to permit setting for varying differential static pressure.
2. Counterweights and spring-assist kits for vertical airflow installations.
3. Electric actuators.
4. Chain pulls.
5. Screen Mounting: Front mounted in sleeve.
  - a. Sleeve Thickness: 20-gage minimum.
  - b. Sleeve Length: 6 inches minimum.
6. Screen Mounting: Rear mounted.
7. Screen Material: Galvanized steel
8. Screen Type: Bird.
9. 90-degree stops.

### 2.3 BAROMETRIC RELIEF DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Air Balance Inc.; a division of Mestek, Inc.
  2. American Warming and Ventilating; a division of Mestek, Inc.
  3. Cesco Products; a division of Mestek, Inc.
  4. Duro Dyne Inc.
  5. Greenheck Fan Corporation.
  6. Lloyd Industries, Inc.
  7. Nailor Industries Inc.
  8. NCA Manufacturing, Inc.
  9. Pottorff; a division of PCI Industries, Inc.
  10. Ruskin Company.
  11. SEMCO Incorporated.
  12. Vent Products Company, Inc.
- B. Suitable for horizontal or vertical mounting.
- C. Maximum Air Velocity: 2000 fpm
- D. Maximum System Pressure: 2-inch wg.
- E. Frame: 0.064-inch- thick, galvanized sheet steel with welded corners and mounting flange.
- F. Blades:
  1. Multiple, 0.025-inch-
  2. Maximum Width: 6 inches.
  3. Action: Parallel.
  4. Balance: Gravity.
  5. Eccentrically pivoted.
- G. Blade Seal : Neoprene.
- H. Blade Axles: Galvanized steel.
- I. Tie Bars and Brackets:
  1. Material: Galvanized steel.

- 2. Rattle free with 90-degree stop.
- J. Return Spring: Adjustable tension.
- K. Bearings: Synthetic.
- L. Accessories:
  - 1. Flange on intake.
  - 2. Adjustment device to permit setting for varying differential static pressures.

## 2.4 MANUAL VOLUME DAMPERS

### A. Low-Leakage, Steel, Manual Volume Dampers:

- 1. Manufacturers: Subject to compliance with requirements:
  - a. Air Balance Inc.; a division of Mestek, Inc.
  - b. American Warming and Ventilating; a division of Mestek, Inc.
  - c. Flexmaster U.S.A., Inc.
  - d. McGill AirFlow LLC.
  - e. METALAIR, Inc.
  - f. Nailor Industries Inc.
  - g. Pottorff; a division of PCI Industries, Inc.
  - h. Ruskin Company.
  - i. Trox USA Inc.
  - j. Vent Products Company, Inc.
- 2. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
- 3. Suitable for horizontal or vertical applications.
- 4. Frames:
  - a. Hat shaped.
  - b. Galvanized-steel channels, 0.064 inch thick.
  - c. Mitered and welded corners.
  - d. Flanges for attaching to walls and flangeless frames for installing in ducts.
- 5. Blades:
  - a. Multiple or single blade.
  - b. Parallel- or opposed-blade design.
  - c. Stiffen damper blades for stability.
  - d. Galvanized, roll-formed steel, 0.064 inch thick.
- 6. Blade Axles: Galvanized steel.
- 7. Bearings:
  - a. Oil-impregnated bronze.
  - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
- 8. Blade Seals: Neoprene.
- 9. Jamb Seals: Cambered aluminum.
- 10. Tie Bars and Brackets: Galvanized steel.

11. Accessories:

- a. Include locking device to hold single-blade dampers in a fixed position without vibration.

B. Jackshaft:

1. Size: 1-inch diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

2.5 CONTROL DAMPERS

A. Manufacturers: Subject to compliance with requirements:

1. American Warming and Ventilating; a division of Mestek, Inc.
2. Arrow United Industries; a division of Mestek, Inc.
3. Cesco Products; a division of Mestek, Inc.
4. Duro Dyne Inc.
5. Flexmaster U.S.A., Inc.
6. Greenheck Fan Corporation.
7. Lloyd Industries, Inc.
8. M&I Air Systems Engineering; Division of M&I Heat Transfer Products Ltd.
9. McGill AirFlow LLC.
10. METALAIRE, Inc.
11. Metal Form Manufacturing, Inc.
12. Nailor Industries Inc.
13. NCA Manufacturing, Inc.
14. Ruskin Company.
15. Vent Products Company, Inc.
16. Young Regulator Company.

B. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.

C. Frames:

1. Hat shaped.
2. Galvanized-steel channels, 0.064 inch thick.
3. Mitered and welded corners.

D. Blades:

1. Multiple blade with maximum blade width of 8 inches.
2. Opposed-blade design.
3. Galvanized steel.

4. 0.064 inch thick.
  5. Blade Edging: Closed-cell neoprene edging.
  6. Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.
- E. Blade Axles: 1/2-inch- diameter; galvanized steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.
1. Operating Temperature Range: From minus 40 to plus 200 deg F.
- F. Bearings:
1. Oil-impregnated bronze.
  2. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
  3. Thrust bearings at each end of every blade.

## 2.6 FIRE DAMPERS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Air Balance Inc.; a division of Mestek, Inc.
  2. Arrow United Industries; a division of Mestek, Inc.
  3. Cesco Products; a division of Mestek, Inc.
  4. Greenheck Fan Corporation.
  5. McGill AirFlow LLC.
  6. METALAIRE, Inc.
  7. Nailor Industries Inc.
  8. NCA Manufacturing, Inc.
  9. PHL, Inc.
  10. Pottorff; a division of PCI Industries, Inc.
  11. Prefco; Perfect Air Control, Inc.
  12. Ruskin Company.
  13. Vent Products Company, Inc.
  14. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Type: Static and dynamic; rated and labeled according to UL 555 by an NRTL.
- C. Closing rating in ducts up to 4-inch wg static pressure class and minimum 4000-fpm velocity.
- D. Fire Rating: 1-1/2 hours.
- E. Frame: Curtain type with blades outside airstream except when located behind grille where blades may be inside airstream]; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
- F. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
1. Minimum Thickness: 0.052 or 0.138 inch thick, as indicated, and of length to suit application.
  2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.

- G. Mounting Orientation: Vertical or horizontal as indicated.
- H. Blades: Roll-formed, interlocking, 0.034-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.
- I. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- J. Heat-Responsive Device: Replaceable, 165 deg Frated, fusible links.
- K. Heat-Responsive Device: Electric resettable link and switch package, factory installed, 165 deg Frated.

## 2.7 CEILING DAMPERS

- A. Manufacturers: Subject to compliance with requirements:
  - 1. Air Balance Inc.; a division of Mestek, Inc.
  - 2. Cesco Products; a division of Mestek, Inc.
  - 3. McGill AirFlow LLC.
  - 4. METALAIRE, Inc.
  - 5. Nailor Industries Inc.
  - 6. Prefco; Perfect Air Control, Inc.
  - 7. Ruskin Company.
  - 8. Vent Products Company, Inc.
  - 9. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. General Requirements:
  - 1. Labeled according to UL 555C by an NRTL.
  - 2. Comply with construction details for tested floor- and roof-ceiling assemblies as indicated in UL's "Fire Resistance Directory."
- C. Frame: Galvanized sheet steel, round or rectangular, style to suit ceiling construction.
- D. Blades: Galvanized sheet steel with refractory insulation.
- E. Heat-Responsive Device: Replaceable, 165 deg F rated, fusible links.
- F. Fire Rating: 2 hours.

## 2.8 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements:
  - 1. Ductmate Industries, Inc.
  - 2. Nexus PDQ; Division of Shilco Holdings Inc.
  - 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Description: Roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

## 2.9 DUCT SILENCERS

- A. Manufacturers: Subject to compliance with requirements:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide:
  - 1. Industrial Noise Control, Inc.
  - 2. McGill AirFlow LLC.
  - 3. Ruskin Company.
  - 4. Vibro-Acoustics.
- C. General Requirements:
  - 1. Factory fabricated.
  - 2. Fire-Performance Characteristics: Adhesives, sealants, packing materials, and accessory materials shall have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E 84.
  - 3. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
- D. Shape:
  - 1. Rectangular straight with splitters or baffles.
  - 2. Round straight with center bodies or pods.
  - 3. Rectangular elbow with splitters or baffles.
  - 4. Round elbow with center bodies or pods.
  - 5. Rectangular transitional with splitters or baffles.
- E. Rectangular Silencer Outer Casing: ASTM A 653/A 653M, G90 alvanized sheet steel, 0.034 inch thick.
- F. Inner Casing and Baffles: ASTM A 653/A 653M, G90 G60 galvanized sheet metal, 0.034 inch thick, and with 1/8-inch- diameter perforations.
- G. Special Construction:
  - 1. Suitable for outdoor use.
  - 2. High transmission loss to achieve STC 45.
- H. Connection Sizes: Match connecting ductwork unless otherwise indicated.
- I. Principal Sound-Absorbing Mechanism:
  - 1. Controlled impedance membranes and broadly tuned resonators without absorptive media.
  - 2. Dissipative type with fill material.
    - a. Fill Material: Inert and vermin-proof fibrous material, packed under not less than 15 percent compression.
    - b. Erosion Barrier: Polymer bag enclosing fill, and heat sealed before assembly.
  - 3. Lining: None:
- J. Fabricate silencers to form rigid units that will not pulsate, vibrate, rattle, or otherwise react to system pressure variations. Do not use mechanical fasteners for unit assemblies.

1. Flange connections.
2. Suspended Units: Factory-installed suspension hooks or lugs attached to frame in quantities and spaced to prevent deflection or distortion.
3. Reinforcement: Cross or trapeze angles for rigid suspension.

K. Accessories:

1. Factory-installed end caps to prevent contamination during shipping.
2. Removable splitters.
3. Airflow measuring devices.

L. Source Quality Control: Test according to ASTM E 477.

1. Testing of mockups to be witnessed by the City of New York.
2. Record acoustic ratings, including dynamic insertion loss and generated-noise power levels with an airflow of at least 2000-fpm face velocity.
3. Leak Test: Test units for airtightness at 200 percent of associated fan static pressure or 6-inch wg static pressure, whichever is greater.

2.10 TURNING VANES

A. Manufacturers: Subject to compliance with requirements:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. METALAIRE, Inc.
4. SEMCO Incorporated.
5. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vanes and Vane Runners," and 2-4, "Vane Support in Elbows."

E. Vane Construction: Single Double wall.

F. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.11 REMOTE DAMPER OPERATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Pottorff; a division of PCI Industries, Inc.
2. Ventfabrics, Inc.
3. Young Regulator Company.

- B. Description: Cable system designed for remote manual damper adjustment, through the face of outlets
- C. Tubing: Brass.
- D. Cable: Stainless steel.

## 2.12 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements:
  - 1. American Warming and Ventilating; a division of Mestek, Inc.
  - 2. Cesco Products; a division of Mestek, Inc.
  - 3. Ductmate Industries, Inc.
  - 4. Flexmaster U.S.A., Inc.
  - 5. Greenheck Fan Corporation.
  - 6. McGill AirFlow LLC.
  - 7. Nailor Industries Inc.
  - 8. Pottorff; a division of PCI Industries, Inc.
  - 9. Ventfabrics, Inc.
  - 10. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."
  - 1. Door:
    - a. Double wall, rectangular.
    - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    - c. Vision panel.
    - d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
    - e. Fabricate doors airtight and suitable for duct pressure class.
  - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
  - 3. Number of Hinges and Locks:
    - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
    - b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
    - c. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches[ with outside and inside handles].
    - d. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.
- C. Pressure Relief Access Door:
  - 1. Door and Frame Material: Galvanized sheet steel.
  - 2. Door: Single wall with metal thickness applicable for duct pressure class.
  - 3. Operation: Open outward for positive-pressure ducts and inward for negative-pressure ducts.
  - 4. Factory set at 10-inch wg.
  - 5. Doors close when pressures are within set-point range.
  - 6. Hinge: Continuous piano.
  - 7. Latches: Cam.

8. Seal: Neoprene or foam rubber.
9. Insulation Fill: 1-inch- thick, fibrous-glass or polystyrene-foam board.

#### 2.13 DUCT ACCESS PANEL ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements:
  1. Ductmate Industries, Inc.
  2. Flame Gard, Inc.
  3. 3M.
- B. Labeled according to UL 1978 by an NRTL.
- C. Panel and Frame: Minimum thickness 0.0528-inch carbon.
- D. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.
- E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.
- F. Minimum Pressure Rating: 10-inch wg, positive or negative.

#### 2.14 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements:
  1. Ductmate Industries, Inc.
  2. Duro Dyne Inc.
  3. Ventfabrics, Inc.
  4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
  1. Minimum Weight: 26 oz./sq. yd..
  2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  3. Service Temperature: Minus 40 to plus 200 deg F.
- F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
  1. Minimum Weight: 24 oz./sq. yd..
  2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
  3. Service Temperature: Minus 50 to plus 250 deg F.
- G. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.

1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
5. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
6. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

## 2.15 FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Flexmaster U.S.A., Inc.
  2. McGill AirFlow LLC.
  3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Noninsulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire.
  1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
  2. Maximum Air Velocity: 4000 fpm.
  3. Temperature Range: Minus 20 to plus 175 deg F.

## 2.16 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install backdraft control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
  2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install fire and smoke dampers according to UL listing.
- H. Install duct security bars. Construct duct security bars from 0.164-inch steel sleeve, continuously welded at all joints and 1/2-inch-diameter steel bars, 6 inches o.c. in each direction in center of sleeve. Weld each bar to steel sleeve and each crossing bar. Weld 2-1/2-by-2-1/2-by-1/4-inch steel angle to 4 sides and both ends of sleeve. Connect duct security bars to ducts with flexible connections. Provide 12-by-12-inch hinged access panel with cam lock in duct in each side of sleeve.
- I. Connect ducts to duct silencers with flexible duct connectors.
- J. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
1. On both sides of duct coils.
  2. Upstream and downstream from duct filters.
  3. At outdoor-air intakes and mixed-air plenums.
  4. At drain pans and seals.
  5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
  6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
  7. At each change in direction and at maximum 50-foot spacing.
  8. Upstream and downstream from turning vanes.
  9. Upstream or downstream from duct silencers.
  10. Control devices requiring inspection.
  11. Elsewhere as indicated.
- K. Install access doors with swing against duct static pressure.
- L. Access Door Sizes:
1. One-Hand or Inspection Access: 8 by 5 inches.
  2. Two-Hand Access: 12 by 6 inches.
  3. Head and Hand Access: 18 by 10 inches.
  4. Head and Shoulders Access: 21 by 14 inches.
  5. Body Access: 25 by 14 inches.
  6. Body plus Ladder Access: 25 by 17 inches.
- M. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- N. Install flexible connectors to connect ducts to equipment.

- O. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- P. Connect terminal units to supply ducts or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- Q. Connect diffusers or light troffer boots to ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- R. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- S. Install duct test holes where required for testing and balancing purposes.
- T. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of movement during start and stop of fans.

### 3.2 FIELD QUALITY CONTROL

#### A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

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## SECTION 233423

### HVAC POWER VENTILATORS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:

1. Utility set fans.
2. Centrifugal roof ventilators.
3. Axial roof ventilators.
4. Upblast propeller roof exhaust fans.
5. Centrifugal wall ventilators.
6. Ceiling-mounting ventilators.
7. In-line centrifugal fans.
8. Propeller fans.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base fan-performance ratings on **actual Project site elevations**.
- B. Operating Limits: Classify according to AMCA 99.

##### 1.4 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
  1. Certified fan performance curves with system operating conditions indicated.
  2. Certified fan sound-power ratings.
  3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
  4. Material thickness and finishes, including color charts.
  5. Dampers, including housings, linkages, and operators.
  6. Roof curbs.
  7. Fan speed controllers.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  1. Wiring Diagrams: Power, signal, and control wiring.
  2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
  3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.

- C. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Roof framing and support members relative to duct penetrations.
  - 2. Ceiling suspension assembly members.
  - 3. Size and location of initial access modules for acoustical tile.
  - 4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.
- C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- D. UL Standard: Power ventilators shall comply with UL 705.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

#### 1.7 COORDINATION

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- C. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

#### 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Belts: **One** set(s) for each belt-driven unit.

## PART 2 - PRODUCTS

### 2.1 UTILITY SET FANS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide **the product indicated on Drawings** or a comparable product by one of the following:
1. Aerovent; a Twin City Fan Company.
  2. American Coolair Corp.
  3. Ammerman; General Resource Corp.
  4. Bayley Fans; a division of Lau Industries, Inc..
  5. Breidert Air Products.
  6. Delhi Industries Inc.
  7. Hartzell Fan, Inc.
  8. Industrial Air; a division of Lau Industries, Inc.
  9. JencoFan; Div. of Breidert Air Products.
  10. Loren Cook Company.
  11. New York Blower Company (The).
  12. Penn Ventilation.
  13. Quietaire Corporation.
  14. Trane.
  15. Greenheck Fan company.
- D. Description: **Belt**-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and accessories.
- E. Housing: Fabricated of **galvanized** steel with side sheets fastened with a deep lock seam or welded to scroll sheets.
1. Housing Discharge Arrangement: Adjustable to eight standard positions.
- F. Fan Wheels: Single-width, single inlet; welded to cast-iron or cast-steel hub and spun-steel inlet cone, with hub keyed to shaft.
1. Blade Materials: **Steel**.
  2. Blade Type: **Backward inclined Airfoil**.
  3. Spark-Resistant Construction: AMCA 99, Type A.
- G. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
- H. Shaft Bearings: Prelubricated and sealed, self-aligning, pillow-block-type ball bearings with ABMA 9, **L<sub>50</sub> of 200,000 hours**.
- I. Belt Drives: Factory mounted, with final alignment and belt adjustment made after installation.
1. Service Factor Based on Fan Motor Size: **1.2**.
  2. Motor Pulleys: Adjustable pitch for use with motors through **5 hp**; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.

3. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
4. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.

J. Accessories:

1. Inlet and Outlet: Flanged.
2. Companion Flanges: Rolled flanges for duct connections of same material as housing.
3. Backdraft Dampers: Gravity actuated with counterweight and interlocking aluminum blades with felt edges in steel frame installed on fan discharge.
4. Access Door: Gasketed door in scroll with latch-type handles.
5. Scroll Dampers: Single-blade damper installed at fan scroll top with adjustable linkage.
6. Inlet Screens: Removable wire mesh.
7. Drain Connections: NPS 3/4 threaded coupling drain connection installed at lowest point of housing.
8. Weather Hoods: Weather resistant with stamped vents over motor and drive compartment.
9. Discharge Dampers: Assembly with **opposed** blades constructed of two plates formed around and to shaft, channel frame, sealed ball bearings, with blades linked outside of airstream to single control lever of same material as housing.
10. Variable Inlet Vanes: With blades supported at both ends with two permanently lubricated bearings of same material as housing. Variable mechanism terminating in single control lever with control shaft for double-width fans.
11. Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.

K. Coatings: **Epoxy Powder-baked enamel.**

2.2 CENTRIFUGAL ROOF VENTILATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide **the product indicated on Drawings** a comparable product by one of the following:
  1. Acme Engineering & Mfg. Corp.
  2. Aerovent; a Twin City Fan Company
  3. American Coolair Corp.
  4. Ammerman; General Resource Corp.
  5. Breidert Air Products.
  6. Broan Mfg. Co., Inc.
  7. Carnes Company HVAC.
  8. Central Blower Co.
  9. Dayton Electric Manufacturing Co.; a division of W. W. Grainger, Inc.
  10. Delhi Industries Inc.
  11. Greenheck.
  12. Hartzell Fan, Inc.
  13. JencoFan; Div. of Breidert Air Products.
  14. Loren Cook Company.
  15. NuTone Inc.
  16. Penn Ventilation.
  17. Quietaire Corporation.

- D. Description: Direct- or belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.
- E. Housing: Removable, **galvanized steel, mushroom-domed top**; square, one-piece, aluminum base with venturi inlet cone.
  - 1. Upblast Units: Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains **and grease collector**.
  - 2. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.
- F. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
- G. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:
  - 1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
  - 2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
  - 3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
  - 4. Fan and motor isolated from exhaust airstream.
- H. Accessories:
  - 1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
  - 2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted **outside** fan housing, factory wired through an internal aluminum conduit.
  - 3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
  - 4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
  - 5. Motorized Dampers: Parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops.
- I. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
  - 1. Configuration: **Built-in cant and mounting flange**.
  - 2. Overall Height: **12 inches**.
  - 3. Sound Curb: Curb with sound-absorbing insulation matrix.
  - 4. Pitch Mounting: Manufacture curb for roof slope.
  - 5. Metal Liner: Galvanized steel.
  - 6. Burglar Bars: **1/2-inch-** thick steel bars welded in place to form 6-inch squares.
  - 7. Mounting Pedestal: Galvanized steel with removable access panel.
  - 8. Vented Curb: Unlined with louvered vents in vertical sides.

### 2.3 CENTRIFUGAL WALL VENTILATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide **the product indicated on Drawings** or a comparable product by one of the following:

1. Acme Engineering & Mfg. Corp.
  2. Aerovent; a Twin City Fan Company.
  3. American Coolair Corp.
  4. Ammerman; General Resource Corp.
  5. Breidert Air Products.
  6. Broan Mfg. Co., Inc.
  7. Carnes Company HVAC.
  8. Dayton Electric Manufacturing Co.; a division of W. W. Grainger, Inc.
  9. Greenheck.
  10. Hartzell Fan, Inc.
  11. JencoFan; Div. of Breidert Air Products.
  12. Loren Cook Company.
  13. NuTone Inc.
  14. Penn Ventilation.
- D. Description: Direct- or belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and accessories.
- E. Housing: Heavy-gage, removable, spun-aluminum, dome top and outlet baffle; venturi inlet cone.
- F. Fan Wheel: Aluminum hub and wheel with backward-inclined blades.
- G. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:
1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
  2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
  3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
  4. Fan and motor isolated from exhaust airstream.
- H. Accessories:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
  2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through internal aluminum conduit.
  3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
  4. Wall Grille: Ring type for flush mounting.
  5. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in wall sleeve; factory set to close when fan stops.
  6. Motorized Dampers: Parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops.

#### 2.4 CEILING-MOUNTING VENTILATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide **the product indicated on Drawings** or a comparable product by one of the following:
1. American Coolair Corp.

2. Ammerman; General Resource Corp.
  3. Breidert Air Products.
  4. Broan Mfg. Co., Inc.
  5. Carnes Company HVAC.
  6. Dayton Electric Manufacturing Co.; a division of W. W. Grainger, Inc.
  7. FloAire.
  8. Greenheck.
  9. JencoFan; Div. of Breidert Air Products.
  10. Loren Cook Company.
  11. NuTone Inc.
  12. Penn Ventilation.
- D. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications.
- E. Housing: Steel, lined with acoustical insulation.
- F. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
- G. Grille: **Painted aluminum**, louvered grille with flange on intake and thumbscrew attachment to fan housing.
- H. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- I. Accessories:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
  2. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
  3. Time-Delay Switch: Assembly with single-pole rocker switch, timer, and cover plate.
  4. Motion Sensor: Motion detector with adjustable shutoff timer.
  5. Ceiling Radiation Damper: Fire-rated assembly with ceramic blanket, stainless-steel springs, and fusible link.
  6. Filter: Washable aluminum to fit between fan and grille.
  7. Isolation: Rubber-in-shear vibration isolators.
  8. Manufacturer's standard roof jack or wall cap, and transition fittings.

## 2.5 IN-LINE CENTRIFUGAL FANS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide **the product indicated on Drawings** or a comparable product by one of the following:
1. Acme Engineering & Mfg. Corp.
  2. American Coolair Corp.
  3. Ammerman; General Resource Corp.
  4. Bayley Fans; a division of Lau Industries, Inc.
  5. Breidert Air Products.

6. Carnes Company HVAC.
7. FloAire.
8. Greenheck.
9. Hartzell Fan, Inc.
10. JencoFan; Div. of Breidert Air Products.
11. Loren Cook Company.
12. Madison Manufacturing.
13. Penn Ventilation.
14. Quietaire Corporation.

- D. Description: In-line, **belt-driven centrifugal fans** consisting of housing, wheel, outlet guide vanes, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets, and accessories.
- E. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
- F. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.
- G. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
- H. Accessories:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
  2. Volume-Control Damper: Manually operated with quadrant lock, located in fan outlet.
  3. Companion Flanges: For inlet and outlet duct connections.
  4. Fan Guards: 1/2- by 1-inch mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
  5. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.

## 2.6 PROPELLER FANS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide **the product indicated on Drawings** or a comparable product by one of the following:
1. Acme Engineering & Mfg. Corp.
  2. Aerovent; a Twin City Fan Company.
  3. Airmaster Fan Co.
  4. American Coolair Corp.
  5. Ammerman; General Resource Corp.
  6. Bayley Fans; a division of Lau Industries, Inc.
  7. Breidert Air Products.
  8. Carnes Company HVAC.
  9. Chicago Blower Corporation.
  10. Cincinnati Fan.
  11. Dayton Electric Manufacturing Co.; a division of W. W. Grainger, Inc.

12. Hartzell Fan, Inc.
  13. Howden Buffalo Inc.
  14. Industrial Air; a division of Lau Industries, Inc.
  15. JencoFan; Div. of Breidert Air Products.
  16. King Co. (The); King Air Systems.
  17. Loren Cook Company.
  18. Madison Manufacturing.
  19. Moffitt Corporation, Inc.
  20. New York Blower Company (The).
  21. NuTone Inc.
  22. Penn Ventilation.
  23. Quietaire Corporation.
  24. Stanley Fans.
- D. Description: Direct- or belt-driven propeller fans consisting of fan blades, hub, housing, orifice ring, motor, drive assembly, and accessories.
- E. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.
- F. Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.
- G. Fan Wheel: Replaceable, **extruded**-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.
- H. Belt-Driven Drive Assembly: Resiliently mounted to housing, statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.
1. Service Factor Based on Fan Motor Size: 1.4.
  2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
  3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
    - a. Ball-Bearing Rating Life: ABMA 9, **L<sub>10</sub> of 100,000 hours.**
  4. Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
  5. Motor Pulleys: Adjustable pitch for use with motors through **5 hp**; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
  6. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
  7. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.
- I. Accessories:
1. Gravity Shutters: Aluminum blades in aluminum frame; interlocked blades with nylon bearings.
  2. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
  3. Wall Sleeve: Galvanized steel to match fan and accessory size.
  4. Weathershield Hood: Galvanized steel to match fan and accessory size.
  5. Weathershield Front Guard: Galvanized steel with expanded metal screen.
  6. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.

7. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

## 2.7 MOTORS

- A. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- B. Enclosure Type: Totally enclosed, fan cooled.

## 2.8 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Support units using **spring isolators** having a static deflection of **1 inch**. Vibration- and seismic-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
  1. Secure vibration and seismic controls to concrete bases using anchor bolts cast in concrete base.
- C. Install floor-mounting units on concrete bases. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- D. Install floor-mounting units on concrete bases designed to withstand, without damage to equipment, the seismic force required by code. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- E. Secure roof-mounting fans to roof curbs with cadmium-plated hardware. Refer to Division 07 Section "Roof Accessories" for installation of roof curbs.
- F. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
- G. Support suspended units from structure using threaded steel rods and **spring hangers** having a static deflection of **1 inch**. Vibration-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- H. Install units with clearances for service and maintenance.
- I. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

### 3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Verify that shipping, blocking, and bracing are removed.
  - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
  - 3. Verify that cleaning and adjusting are complete.
  - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
  - 5. Adjust belt tension.
  - 6. Adjust damper linkages for proper damper operation.
  - 7. Verify lubrication for bearings and other moving parts.
  - 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
  - 9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
  - 10. Shut unit down and reconnect automatic temperature-control operators.
  - 11. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

### 3.4 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Refer to Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
- D. Replace fan and motor pulleys as required to achieve design airflow.
- E. Lubricate bearings.

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## SECTION 233713

### DIFFUSERS, REGISTERS, AND GRILLES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

###### A. Section Includes:

1. Round ceiling diffusers.
2. Drum louvers.
3. Adjustable registers grilles.
4. VAV Diffusers
5. Linear bar grilles.
6. Constant volume, pressure independent exhaust grilles

###### B. Related Sections:

1. Section 089119 "Fixed Louvers" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
2. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

##### 1.3 ACTION SUBMITTALS

###### A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

###### B. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

##### 1.4 INFORMATIONAL SUBMITTALS

###### A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Duct access panels.

- B. Source quality-control reports.

## PART 2 - PRODUCTS

### 2.1 CEILING DIFFUSERS

A. Round Ceiling Diffuser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Carnes.
  - b. Hart & Cooley Inc.
  - c. METALAIRE, Inc.
  - d. Nailor Industries Inc.
  - e. Price Industries.
  - f. Titus.
  - g. Tuttle & Bailey.
  - h. Approved equal
2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Steel .
4. Finish: Baked enamel, color selected by Commissioner.
5. Face Style: single cone/plaque.
6. Mounting: Duct connection.
7. Dampers: Combination damper and grid.
8. Accessories:
  - a. Equalizing grid.
  - b. Plaster ring.
  - c. Safety chain.
  - d. Wire guard.
  - e. Sectorizing baffles.
  - f. Operating rod extension.

### 2.2 HIGH-CAPACITY DIFFUSERS

A. Drum Louver:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Air Research Diffuser Products, Inc.
  - b. Anemostat Products; a Mestek company.
  - c. Carnes.
  - d. Hart & Cooley Inc.
  - e. Krueger.
  - f. METALAIRE, Inc.
  - g. Nailor Industries Inc.
  - h. Price Industries.
  - i. Titus.
  - j. Tuttle & Bailey.
  - k. Approved equal.
2. Airflow Principle: Extended distance for high airflow rates.
3. Material: Aluminum, heavy gage extruded.
4. Finish: White baked acrylic.
5. Border: 1-1/4-inch width with countersunk screw holes.
6. Gasket between drum and border.
7. Body: Drum shaped; adjustable vertically.

8. Blades: Individually adjustable horizontally.
9. Mounting: Surface to wall.
10. Accessories:
  - a. Opposed-blade steel damper in duct work with cable operated damper.
  - b. Duct-mounting collars with countersunk screw holes.

## 2.3 REGISTERS AND GRILLES

### A. Adjustable Register:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. A-J Manufacturing Co., Inc.
  - b. Anemostat Products; a Mestek company.
  - c. Carnes.
  - d. Dayus Register & Grille Inc.
  - e. Hart & Cooley Inc.
  - f. Krueger.
  - g. METALAIRE, Inc.
  - h. Nailor Industries Inc.
  - i. Price Industries.
  - j. Titus.
  - k. Tuttle & Bailey.
  - l. Approved equal.
2. Material: Steel or Aluminum.
3. Finish: Baked enamel, color selected by Commissioner.

## 2.4 VAV Diffusers

### A. Round electric VAV diffuser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Acutherm.
  - b. Thermal Products
  - c. Price.
  - d. Approved equal.
2. Control
  - a. Electric 24 V actuator
  - b. DDC Remote set point adjuster with room temperature display
  - c. Tool-free adjustment of maximum air flow.

## 2.5 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Commissioner for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

### 3.3 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

## SECTION 237413

### PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SECTION INCLUDES

- A. Package roof top unit.
- B. Heat exchanger.
- C. Refrigeration components.
- D. Unit operating controls.
- E. Roof curb.
- F. Electrical power connections.
- G. Operation and maintenance service.

##### 1.3 RELATED SECTIONS

- A. Section 230513 - Motors.
- B. Section 230548 - Vibration Isolation.
- C. Section 230700 - Ductwork Insulation.
- D. Section 230993 - Sequence of Operation.

##### 1.4 REFERENCES

- A. NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems.
- B. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
- C. AHRI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard.
- D. ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment.
- E. ANSI/ASHRAE/IESNA 90.1-2007 - Energy Standard for New Buildings Except Low-Rise Residential Buildings.
- F. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.

- G. AHRI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.
- H. ANSI/NFPA 70-1995 - National Electric Code.
- I. New York City Code

#### 1.5 SUBMITTALS

- A. Submit unit performance data including: capacity, nominal and operating performance.
- B. Submit Mechanical Specifications for unit and accessories describing construction, components and options.
- C. Submit shop drawings indicating overall dimensions as well as installation, operation and services clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
- D. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.
- E. Shop drawings submitted for approval shall be accompanied by a copy of the purchase agreement between the Contractor and an authorized service representative of the manufacturer for check, test and start up and first year service.
- F. Acoustical reports prepared by a qualified acoustician certifying the acoustical performance of the RTU installation as built and as submitted is in compliance with NYC DEP and DOB regulations.

#### 1.6 DELIVERY, STORAGE and HANDLING

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- B. Protect units from physical damage. Leave factory shipping covers in place until installation.

#### 1.7 WARRANTY

- A. Provide for five years for all parts including compressors, controls, casing, fans etc. except consumable parts which shall be limited to bearing lubrication, belts and filters. Refrigerant that leaks due to failed factory workmanship shall be replaced at manufacturer's cost.
- B. Provide 1 year labor warranty
- C. Provide 10 year heat exchanger limited warranty.
- D. Warranty periods shall begin running down after the units pass commissioning or after substantial completion is declared by the commissioner, whichever occurs first.
- E. Units shall not be utilized for space conditioning during construction.

#### 1.8 MAINTENANCE SERVICE

- A. Furnish complete parts and labor service and maintenance of packaged roof top units for one year from Date of Substantial Completion by contractor.

- B. Provide maintenance service with a two month interval as maximum time period between calls. Provide 24 hour emergency service on breakdowns and malfunctions.
- C. Include maintenance items as outlined in manufacturer's operating and maintenance data.
- D. Submit copy of service call work order or report and include description of work performed.

#### 1.9 REGULATORY REQUIREMENTS

- A. Unit shall conform to ANSI Z21.47/UL1995 for construction of packaged air conditioner and shall have U.L. label affixed to rooftop package.
  - 1. In the event the unit is not UL approved, the manufacturer must, at his expense, provide for a field inspection by a UL representative to verify conformance to UL standards. If necessary, contractor shall perform modifications to the unit to comply with UL, as directed by the UL representative, at no additional expense to the City of New York .

### PART 2 PRODUCTS

#### 2.1 SUMMARY

- A. The contractor shall furnish and install package rooftop unit(s) as shown and scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.
- B. APPROVED MANUFACTURERS
  - 1. Trane
  - 2. Daikin-McQuay Rebel line only
  - 3. Energylabs
  - 4. Mammoth
  - 5. Approved Equal

#### 2.2 GENERAL UNIT DESCRIPTION

- A. Unit(s) furnished and installed shall be combination gas heating/electric cooling packaged rooftop (s) as scheduled on contract documents and these specifications. Cooling capacity ratings shall be based on AHRI Standard 360. Unit(s) shall consist of insulated weather-tight casing with compressor(s), air-cooled condenser coil, condenser fans, evaporator coil, return-air filters, supply motors and unit controls, and gas-fired heating section.
- B. Unit(s) shall be 100% factory run tested and fully charged with R-410A, and manufacturer shall supply a technician knowledgeable of the controllers in the unit and capable of demonstrating all functions thereof to the commissioning agent..
- C. Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.
- D. Units shall be dedicated downflow or dedicated horizontal airflow as manufactured.

- E. Wiring internal to the unit shall be colored and numbered for identification.

## 2.3 UNIT CASING

- A. Cabinet: Galvanized steel, phosphatized, and finished with an air-dry paint coating with removable access panels. Structural members shall be 16 gauge with access doors and removable panels of minimum 20 gauge.
- B. Units cabinet surface shall be tested 1000 hours in salt spray test in compliance with ASTM B117.
- C. Cabinet construction shall allow for all service/ maintenance from one side of the unit.
- D. Cabinet top cover shall be one piece construction or where seams exist, it shall be double-hemmed and gasket-sealed.
- E. Access Panels: Water- and air-tight panels with handles shall provide access to filters, heating section, return air fan section, supply air fan section, evaporator coil section, and unit control section.
- F. Downflow unit's base pans shall have a raised 1 1/8 inch high lip around the supply and return openings for water integrity.
- G. Insulation: Provide 1/2 inch thick coated fiberglass insulation on all exterior panels in contact with the return and conditioned air stream.
- H. Provide openings either on side of unit or thru the base for power, control and gas connections.
- I. The base of the unit shall have provisions for forklift and crane lifting

## 2.4 FANS AND MOTORS

- A. Provide evaporator fan section with forward curved, double width, double inlet, centrifugal type fan.
- B. Provide self-aligning, grease lubricated, ball or sleeve bearings with permanent lubrication fittings.
- C. Provide units 12 1/2 tons and above with belt driven, supply fans with adjustable motor and fan sheaves.
- D. Outdoor and Indoor Fan factory-installed high-efficiency 2 horsepower and larger motors shall be permanently lubricated and have internal thermal overload protection.
- E. Outdoor fans shall be direct drive, statically and dynamically balanced, draw through in the vertical discharge position. Condenser fans shall have molded, wide chord blades.
- F. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

## 2.5 GAS FIRED HEATING SECTION

- A. Completely assembled and factory installed heating system shall be integral to unit, UL or CSA approved specifically for outdoor applications for use downstream from refrigerant cooling coils. Threaded connection with plug or cap provided. Provide capability for gas piping through the side of the unit.
- B. Heating section shall be factory run tested prior to shipment.
- C. Gas Burner shall be forced combustion type power burner, negative pressure gas valve, manual shut-off, hot surface ignition, and flame sensing safety control.
- D. Gas Burner Safety Controls: Provide safety controls for the proving of combustion air prior to ignition, and continuous flame supervision. Upon a failure to ignite, two attempts of ignition will occur before lockout of the ignition system.
- E. Combustion blower shall be centrifugal type fan with built-in thermal overload protection on fan motor.
- F. Heat Exchanger: Provide drum and tube heat exchanger of free floating design manufactured from stainless steel, factory pressure and leak tested.
- G. Limit controls: High temperature limit controls will shut off gas flow in the event of excessive temperatures resulting from restricted indoor airflow or loss of indoor airflow.
- H. Gas heat shall be 5:1 modulating and should be controlled to deliver specific leaving air temperatures based on heating load.

## 2.6 EVAPORATOR COIL

- A. Provide configured aluminum fin surface mechanically bonded to copper tubing coil.
- B. Provide an independent expansion device for each refrigeration circuit. Factory pressure test at 450 psig and leak test at 200 psig.
- C. Provide drain pan for base of evaporator coil constructed of PVC or galvanized steel with external connections.

## 2.7 CONDENSER SECTION

- A. Provide vertical discharge, direct drive fans with aluminum blades. Fans shall be statically balanced. Motors shall be permanently lubricated, with integral thermal overload protection in a weather tight casing.

## 2.8 REFRIGERATION SYSTEM

- A. Compressor(s): Provide scroll compressor with direct drive operating at 3600 rpm. Integral centrifugal oil pump. Provide suction gas cooled motor with winding temperature limits and compressor overloads.
- B. Units shall have cooling capabilities down to 0 degree F as standard. For field-installed low ambient accessory, the manufacturer shall provide a factory-authorized service technician that will assure proper installation and operation.
- C. Provide each unit with two refrigerant circuit(s) factory-supplied completely piped with liquid

line filter-drier, suction and liquid line pressure ports.

- D. For heat pump units, provide reversing valve, discharge muffler, flow control check valve, and electronic time initiated, temperature terminated defrost control(12 1/2-20 tons).

## 2.9 OUTDOOR AIR SECTION

- A. Provide economizer with automatic differential enthalpy control field-installed.
- B. Provide adjustable minimum position control located in the economizer section of the unit.
- C. Provide spring return motor for outside air damper closure during unit shutdown or power interruption.

## 2.10 OPERATING CONTROLS

- A. Provide factory-wired roof top units with 24 volt control circuit with control transformers, contactor pressure lugs or terminal block for power wiring. Contractor to provide factory-installed unit-mounted disconnect switch. Units shall have single point power connections. Field wiring of zone controls to be NEC Class II.
- B. Provide microprocessor unit-mounted control which when used with an electronic zone sensor provides proportional integral room control. This UCM shall perform all unit functions by making all heating, cooling and ventilating decisions through resident software logic.
- C. Provide factory-installed indoor evaporator defrost control to prevent compressor slugging by interrupting compressor operation.
- D. Provide a anti-cycle timing and minimum on/off between stages timing in the microprocessor.
- E. Economizer Preferred Cooling - Compressor operation is integrated with economizer cycle to allow mechanical cooling when economizer is not adequate to satisfy zone requirements. Compressors are enabled if space temperature is recovering to cooling setpoint at a rate of less than 0.2 degrees per minute. Compressor low ambient lockout overrides this function.
- F. Space CO2 sensors shall be provided for each space served.

## 2.11 STAGING CONTROLS

- A. Provide Honeywell Webstat Thermostats

## 2.12 ROOF CURB AND VIBRATION CONTROLS

- A. Contractor shall provide factory supplied vibration rated roof curb or vibration rail and bottom enclosure panel for dunnage mounting, 16 gauge perimeter made of zinc coated steel with supply and return air gasketing and wood nailer strips. Ship knocked down and provided with instructions for easy assembly.
- B. Curb shall be manufactured in accordance with the National Roofing Contractors Association guidelines and shall be coordinated with the roofing specification.

## PART 3 EXECUTION

3.1 EXAMINATION

- A. Contractor shall verify that roof is ready to receive work and opening dimensions are as illustrated by the manufacturer.
- B. Contractor shall verify that proper power supply is available.

3.2 INSTALLATION

- A. Contractor shall install in accordance with all manufacturer's instructions. Written instructions shall supersede verbal instructions.
- B. Mount units on field fabricated dunnage
- C. Provide galvanized bottom panel to protect bottom of unit.
- D. Do not run units for temporary heating or cooling.

END OF SECTION 237413

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## SECTION 238219

### FAN COIL UNITS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes fan-coil units and accessories.

##### 1.3 DEFINITIONS

- A. BAS: Building automation system.

##### 1.4 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. LEED Submittals:
  - 1. Product Data for Credit EA 4: Documentation required by Credit EA 4 indicating that equipment and refrigerants comply.
  - 2. Product Data for Prerequisite EQ 1: Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."
- C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 1. Wiring Diagrams: Power, signal, and control wiring.
- D. Coordination Drawings: Floor plans, reflected ceiling plans, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Ceiling suspension components.
  - 2. Structural members to which fan-coil units will be attached.
  - 3. Method of attaching hangers to building structure.
  - 4. Size and location of initial access modules for acoustical tile.
  - 5. Items penetrating finished ceiling, including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Sprinklers.
    - e. Access panels.

- 6. Perimeter moldings for exposed or partially exposed cabinets.
  - E. Samples for Initial Selection: For units with factory-applied color finishes.
  - F. Samples for Verification: For each type of fan-coil unit indicated.
  - G. Manufacturer Seismic Qualification Certification: Submit certification that fan-coil units, accessories, and components will withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Include the following:
    - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
      - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
      - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
    - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
    - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
  - H. Field quality-control test reports.
  - I. Operation and Maintenance Data: For fan-coil units to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
    - 1. Maintenance schedules and repair part lists for motors, coils, integral controls, and filters.
  - J. Warranty: Special warranty specified in this Section.
- 1.5 QUALITY ASSURANCE
- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
  - C. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- 1.6 COORDINATION
- A. Coordinate layout and installation of fan-coil units and suspension system components with other construction that penetrates or is supported by ceilings, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.
  - B. Coordinate size and location of wall sleeves for outdoor-air intake.

## 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of condensing units that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Compressor failure.
    - b. Condenser coil leak.
  - 2. Warranty Period: Five years from date of Substantial Completion.
  - 3. Warranty Period (Compressor Only): Five years from date of Substantial Completion.
  - 4. Warranty Period (Condenser Coil Only): Five years from date of Substantial Completion.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fan-Coil-Unit Filters: Furnish 2 spare filters for each filter installed.
  - 2. Fan Belts: Furnish 2 spare fan belts for each unit installed.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
- B. In the Fan-Coil-Unit Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
  - 3. Basis-of-Design Product: The design for each fan-coil unit is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

### 2.2 FAN-COIL UNITS

- A. Basis-of-Design Product: a comparable product by one of the following:
- B. Manufacturers:
  - 1. Airtherm; a Mestek Company.
  - 2. Carrier Corporation.
  - 3. Engineered Air Ltd.
  - 4. Environmental Technologies, Inc.
  - 5. International Environmental Corporation.
  - 6. Marlo Coil; Subsidiary of Engineered Support Systems, Inc.

7. McQuay International.
  8. Rosemex.
  9. Trane.
  10. USA Coil & Air.
  11. YORK International Corporation.
- C. Description: Factory-packaged and -tested units rated according to ARI 440, ASHRAE 33, and UL 1995.
- D. Coil Section Insulation: 1-inch thick, coated glass fiber complying with ASTM C 1071 and attached with adhesive complying with ASTM C 916.
1. Fire-Hazard Classification: Insulation and adhesive shall have a combined maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
  2. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
- E. Main and Auxiliary Drain Pans: Insulated galvanized steel with plastic liner. Fabricate pans and drain connections to comply with ASHRAE 62.1-2004. Drain pans shall be removable.
- F. Chassis: Galvanized steel where exposed to moisture. Floor-mounting units shall have leveling screws.
- E. Cabinet: Steel with baked-enamel finish in manufacturer's standard paint color as selected by Commissioner.
1. Vertical Unit Front Panels: Removable, steel, with integral stamped polyethylene [steel] discharge grille and channel-formed edges, cam fasteners, and insulation on back of panel.
  2. Horizontal Unit Bottom Panels: Fastened to unit with cam fasteners and hinge and attached with safety chain; with integral stamped discharge grilles.
  3. Stack Unit Discharge and Return Grille: Aluminum double-deflection discharge grille, and louvered- or panel-type return grille; color as selected by Commissioner from manufacturer's standard colors. Return grille shall provide maintenance access to fan-coil unit.
  4. Steel recessing flanges for recessing fan-coil units into ceiling or wall.
- G. Outdoor-Air Wall Box: Minimum 0.1265-inch- thick, aluminum, rain-resistant louver and box with integral eliminators and bird screen.
1. Louver Configuration: Horizontal, rain-resistant louver.
  2. Louver Material: Aluminum.
  3. Bird Screen: 1/2-inch mesh screen on interior side of louver.
  4. Decorative Grille: On outside of intake.
  5. Finish: Anodized aluminum, color as selected by Commissioner from manufacturer's standard colors.
- H. Outdoor-Air Damper: Galvanized-steel blades with edge and end seals and nylon bearings; with electronic, two-position actuators.
- I. Filters: Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
1. Pleated Cotton-Polyester Media: 90 percent arrestance and 13 MERV.

- J. Hydronic Coils: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch, rated for a minimum working pressure of 200 psig and a maximum entering-water temperature of 220 deg F. Include manual air vent and drain valve.
- K. Fan and Motor Board: Removable.
  - 1. Fan: Forward curved, double width, centrifugal; directly connected to motor. Thermoplastic or painted-steel wheels, and aluminum, painted-steel, or galvanized-steel fan scrolls.
  - 2. Motor: Permanently lubricated, multispeed; resiliently mounted on motor board. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  - 3. Wiring Termination: Connect motor to chassis wiring with plug connection.
- L. Factory, Hydronic Piping Package: ASTM B 88, Type L copper tube with wrought-copper fittings and brazed joints. Label piping to indicate service, inlet, and outlet.
  - 1. Two-way, modulating control valve for dual-temperature coil.
  - 2. Hose Kits: Minimum 400-psig working pressure, and operating temperatures from 33 to 211 deg F. Tag hose kits to equipment designations.
    - a. Length: 24 inches.
    - b. Minimum Diameter: Equal to fan-coil-unit connection size.
  - 3. Two-Piece Ball Valves: Bronze body with full-port, chrome-plated bronze ball; PTFE or TFE seats; and 600-psig minimum CWP rating and blowout-proof stem.
  - 4. Calibrated-Orifice Balancing Valves: Bronze body, ball type; 125-psig working pressure, 250-deg F maximum operating temperature; with calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, threaded ends, and equipped with a memory stop to retain set position.
  - 5. Automatic Flow-Control Valve: Brass or ferrous-metal body; 300-psig working pressure at 250 deg F, with removable, corrosion-resistant, tamperproof, self-cleaning piston spring; factory set to maintain constant indicated flow with plus or minus 10 percent over differential pressure range of 2 to 80 psig.
  - 6. Y-Pattern Hydronic Strainers: Cast-iron body (ASTM A 126, Class B); 125-psig working pressure; with threaded connections, bolted cover, perforated stainless-steel basket, and bottom drain connection. Include minimum NPS 1/2 hose-end, full-port, ball-type blowdown valve in drain connection.
  - 7. Wrought-Copper Unions: ASME B16.22.
  - 8. Risers: ASTM B 88, Type L copper pipe with hose and ball valve for system flushing.
- M. Control devices and operational sequences are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."
- N. DDC Terminal Controller:
  - 1. Scheduled Operation: Occupied and unoccupied periods on seven-day clock with a minimum of four programmable periods per day.
  - 2. Unoccupied Period Override Operation: Two hours.
  - 3. Unit Supply-Air Fan Operation:
    - a. Occupied Periods: Fan runs continuously.
    - b. Unoccupied Periods: Fan cycles to maintain room setback temperature.

4. Hydronic-Cooling-Coil Operation:

- a. Occupied Periods: Modulate control valve to maintain room temperature.
- b. Unoccupied Periods: Close control valve.

5. Heating-Coil Operation:

- a. Occupied Periods: Modulate control valve to provide heating if room temperature falls below thermostat set point.
- b. Unoccupied Periods: Start fan and modulate control valve if room temperature falls below setback temperature.

6. Controller shall have volatile-memory backup.

O. BAS Interface Requirements:

- 1. Interface relay for scheduled operation.
- 2. Interface relay to provide indication of fault at the central workstation.
- 3. Provide BACnet interface for central BAS workstation for the following functions:
  - a. Adjust set points.
  - b. Fan-coil-unit start, stop, and operating status.
  - c. Occupied and unoccupied schedules.
  - d. Refer to BAS for full FCU control set point and control.

P. Electrical Connection: Factory wire motors and controls for a single electrical connection.

2.3 DUCTED FAN-COIL UNITS

A. Basis-of-Design Product: or a comparable product by one of the following:

B. Manufacturers:

- 1. Carrier Corporation.
- 2. Engineered Air Ltd.
- 3. Environmental Technologies, Inc.
- 4. International Environmental Corporation.
- 5. Marlo Coil; Subsidiary of Engineered Support Systems, Inc.
- 6. McQuay International.
- 7. Rosemex.
- 8. Trane.
- 9. USA Coil & Air.
- 10. YORK International Corporation.

C. Description: Factory-packaged and -tested units rated according to ARI 440, ASHRAE 33, and UL 1995.

D. Coil Section Insulation: 1-inch thick coated glass fiber complying with ASTM C 1071 and attached with adhesive complying with ASTM C 916.

- 1. Fire-Hazard Classification: Insulation and adhesive shall have a combined maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
- 2. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

- E. Drain Pans: Insulated galvanized steel with plastic liner. Fabricate pans and drain connections to comply with ASHRAE 62.1-2004.
- F. Chassis: Galvanized steel where exposed to moisture, with baked-enamel finish and removable access panels.
- G. Cabinets: Steel with baked-enamel finish in manufacturer's standard paint color.
  - 1. Supply-Air Plenum: Sheet metal plenum finished and insulated to match the chassis with mill-finish, aluminum, double-deflection grille.
  - 2. Return-Air Plenum: Sheet metal plenum finished to match the chassis.
  - 3. Mixing Plenum: Sheet metal plenum finished and insulated to match the chassis with outdoor- and return-air, formed-steel dampers.
  - 4. Dampers: Galvanized steel with extruded-vinyl blade seals, flexible-metal jamb seals, and interlocking linkage.
- H. Filters: Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
  - 1. Pleated Cotton-Polyester Media: 90 percent arrestance and 13 MERV.
- I. Hydronic Coils: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch, rated for a minimum working pressure of 200 psig and a maximum entering-water temperature of 220 deg F. Include manual air vent and drain.
- J. Indoor Refrigerant Coils: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch, and brazed joints at fittings. Comply with ARI 210/240, and leak test to minimum 450 psig for a minimum 300-psig working pressure. Include thermal expansion valve.
- K. Belt-Driven Fans: Double width, forward curved, centrifugal; with permanently lubricated, single-speed motor installed on an adjustable fan base resiliently mounted in the cabinet. Aluminum or painted-steel wheels, and painted-steel or galvanized-steel fan scrolls.
  - 1. Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- L. Factory, Hydronic Piping Package: ASTM B 88, Type L copper tube with wrought-copper fittings and brazed joints. Label piping to indicate service, inlet, and outlet.
  - 1. Two Three-way, two-position modulating control valve for chilled-water coil.
  - 2. Two Three-way, two-position modulating control valve for heating coil.
  - 3. Hose Kits: Minimum 400-psig working pressure, and operating temperatures from 33 to 211 deg F. Tag hose kits to equipment designations.
    - a. Length: 24 inches.
    - b. Minimum Diameter: Equal to fan-coil-unit connection size.
  - 4. Two-Piece Ball Valves: Bronze body with full-port, chrome-plated bronze ball; PTFE or TFE seats; and 600-psig minimum CWP rating and blowout-proof stem.
  - 5. Calibrated-Orifice Balancing Valves: Bronze body, ball type; 125-psig working pressure, 250 deg F maximum operating temperature; with calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, threaded ends, and equipped with a memory stop to retain set position.
  - 6. Automatic Flow-Control Valve: Brass or ferrous-metal body; 300-psig working pressure at 250 deg F; with removable, corrosion-resistant, tamperproof, self-cleaning piston

- spring; factory set to maintain constant indicated flow with plus or minus 10 percent over differential pressure range of 2 to 80 psig.
7. Y-Pattern Hydronic Strainers: Cast-iron body (ASTM A 126, Class B); 125-psig working pressure, with threaded connections, bolted cover, perforated stainless-steel basket, and bottom drain connection. Include minimum NPS 1/2 hose-end, full-port, ball-type blowdown valve in drain connection.
  8. Wrought-Copper Unions: ASME B16.22.
- M. Remote condensing units are specified in Division 23 Section "Packaged Compressor and Condenser Units."
- N. Basic Unit Controls:
1. Control voltage transformer.
  2. Wall-mounting thermostat with the following features.
    - a. Heat-cool-off switch.
    - b. Fan on-auto switch.
    - c. Fan-speed switch.
    - d. Manual changeover.
    - e. Adjustable deadband.
    - f. Concealed set point.
    - g. Concealed indication.
    - h. Degree F indication.
  3. Wall-mounting humidistat.
    - a. Concealed set point.
    - b. Exposed indication.
  4. Wall-mounting temperature sensor.
  5. Unoccupied-period-override push button.
  6. Data entry and access port.
    - a. Input data includes room temperature, and humidity set points and occupied and unoccupied periods.
    - b. Output data includes room temperature and humidity, supply-air temperature, entering-water temperature, operating mode, and status.
- O. DDC Terminal Controller:
1. Scheduled Operation: Occupied and unoccupied periods on seven-day clock with a minimum of four programmable periods per day.
  2. Unoccupied Period Override Operation: Two hours.
  3. Unit Supply-Air Fan Operation:
    - a. Occupied Periods: Fan runs continuously.
    - b. Unoccupied Periods: Fan cycles to maintain room setback temperature.
  4. Hydronic-Cooling-Coil Operation:
    - a. Occupied Periods: Modulate control valve to maintain room temperature.
    - b. Unoccupied Periods: Close control valve.
  5. Heating-Coil Operation:

- a. Occupied Periods: Modulate control valve Energize to provide heating if room temperature falls below thermostat set point.
  - b. Unoccupied Periods: Start fan and [open control valve] [modulate control valve] [energize electric-resistance coil] if room temperature falls below setback temperature.
  - c. Switch refrigerant-reversing valve to operate supplemental coil for heating when outdoor temperature is below 25 deg F.
  - d. Unoccupied Periods: Close outdoor-air damper and open return-air damper.
6. Controller shall have volatile-memory backup.
- P. BAS Interface Requirements:
- 1. Interface relay for scheduled operation.
  - 2. Interface relay to provide indication of fault at the central workstation.
  - 3. Provide BACnet interface for central BAS workstation for the following functions:
    - a. Adjust set points.
    - b. Fan-coil-unit start, stop, and operating status.
    - c. Data inquiry including outdoor-air damper position, supply- and room-air temperature.
    - d. Occupied and unoccupied schedules.
- Q. Electrical Connection: Factory wire motors and controls for a single electrical connection.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas to receive fan-coil units for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for piping and electrical connections to verify actual locations before fan-coil-unit installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install fan-coil units level and plumb.
- B. Install fan-coil units to comply with NFPA 90A.
- C. Suspend fan-coil units from structure with elastomeric hangers. Vibration isolators are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- D. Verify locations of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches above finished floor.
- E. Install new filters in each fan-coil unit within two weeks after Substantial Completion.

### 3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties. Specific connection requirements are as follows:
  - 1. Install piping adjacent to machine to allow service and maintenance.
  - 2. Connect piping to fan-coil-unit factory hydronic piping package. Install piping package if shipped loose.
  - 3. Connect condensate drain to indirect waste.
    - a. Install condensate trap of adequate depth to seal against the pressure of fan. Install cleanouts in piping at changes of direction.
- B. Connect supply and return ducts to fan-coil units with flexible duct connectors specified in Division 23 Section "Air Duct Accessories." Comply with safety requirements in UL 1995 for duct connections.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
  - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
  - 3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.

### 3.5 ADJUSTING

- A. Adjust initial temperature and humidity set points.
- B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

### 3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train City of New York's maintenance personnel to adjust, operate, and maintain fan-coil units.

END OF SECTION 238219

## SECTION 23 82 39

### UNIT HEATERS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

1. Cabinet unit heaters with centrifugal fans and hot-water coils.
2. Propeller unit heaters with hot-water coils.
3. Wall and ceiling heaters with propeller fans and electric-resistance heating coils.

##### 1.3 DEFINITIONS

- A. BAS: Building automation system.
- B. CWP: Cold working pressure.
- C. PTFE: Polytetrafluoroethylene plastic.
- D. TFE: Tetrafluoroethylene plastic.

##### 1.4 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each product indicated.
- B. LEED Submittal:
  1. Product Data for Prerequisite EQ 1: Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."
- C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  1. Plans, elevations, sections, and details.
  2. Location and size of each field connection.
  3. Details of anchorages and attachments to structure and to supported equipment.
  4. Equipment schedules to include rated capacities, operating characteristics, furnished specialties, and accessories.
  5. Location and arrangement of piping valves and specialties.
  6. Location and arrangement of integral controls.
  7. Wiring Diagrams: Power, signal, and control wiring.

- D. Coordination Drawings: Floor plans, reflected ceiling plans, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Suspended ceiling components.
  2. Structural members to which unit heaters will be attached.
  3. Method of attaching hangers to building structure.
  4. Size and location of initial access modules for acoustical tile.
  5. Items penetrating finished ceiling, including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Sprinklers.
    - e. Access panels.
    - f. Mechanical, and electrical equipment.
  6. Perimeter moldings for exposed or partially exposed cabinets.
- E. Samples for Initial Selection: Finish colors for units with factory-applied color finishes.
- F. Samples for Verification: Finish colors for each type of cabinet unit heater and wall and ceiling heaters indicated with factory-applied color finishes.
- G. Manufacturer Seismic Qualification Certification: Submit certification that cabinet unit heaters, accessories, and components will withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Include the following:
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- H. Field quality-control test reports.
- I. Operation and Maintenance Data: For cabinet unit heaters to include in emergency, operation, and maintenance manuals.
- 1.5 QUALITY ASSURANCE
- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

- C. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."

## 1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Cabinet Unit Heater Filters: Furnish [one] <Insert number> spare filter(s) for each filter installed.

## PART 2 - PRODUCTS

### 2.1 CABINET UNIT HEATERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - 1. Airtherm; a Mestek Company.
  - 2. Berko Electric Heating; a division of Marley Engineered Products.
  - 3. Carrier Corporation.
  - 4. Chromalox, Inc.; a division of Emerson Electric Company.
  - 5. Indeeco.
  - 6. International Environmental Corporation.
  - 7. Markel Products; a division of TPI Corporation.
  - 8. Marley Electric Heating; a division of Marley Engineered Products.
  - 9. McQuay International.
  - 10. Ouellet Canada Inc.
  - 11. QMark Electric Heating; a division of Marley Engineered Products.
  - 12. Rosemex Products.
  - 13. USA Coil & Air.
- D. Description: A factory-assembled and -tested unit complying with ARI 440.
  - 1. Comply with UL 2021.
- E. Coil Section Insulation: ASTM C 1071; surfaces exposed to airstream shall be aluminum-foil facing to prevent erosion of glass fibers.
  - 1. Thickness: 1/2 inch.
  - 2. Thermal Conductivity (k-Value): 0.26 Btu x in./h x sq. ft. at 75 deg F mean temperature.
  - 3. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM E 84.
  - 4. Adhesive: Comply with ASTM C 916 and with NFPA 90A or NFPA 90B.
  - 5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

- F. Coil Section Insulation: Comply with NFPA 90A or NFPA 90B. Unicellular polyethylene thermal plastic, preformed sheet insulation complying with ASTM C 534, Type II, except for density.
1. Thickness: 3/8 inch.
  2. Thermal Conductivity (k-Value): 0.24 Btu x in./h x sq. ft. at 75 deg F mean temperature.
  3. Fire-Hazard Classification: Maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM C 411.
  4. Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
  5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
- G. Cabinet: Steel with baked-enamel finish with manufacturer's standard paint, in color selected by Commissioner.
1. Vertical Unit, Exposed Front Panels: Minimum 0.0528-inch- thick, sheet steel, removable panels with channel-formed edges secured with tamperproof cam fasteners.
  2. Horizontal Unit, Exposed Bottom Panels: Minimum [0.0528-inch- thick, sheet steel, removable panels secured with tamperproof cam fasteners and safety chain.
  3. Recessing Flanges: Steel, finished to match cabinet.
  4. Control Access Door: Key operated.
  5. Base: Minimum 0.0528-inch- thick steel, finished to match cabinet, 4 inches high with leveling bolts.
  6. Extended Piping Compartment: 8-inch- wide piping end pocket.
  7. False Back: Minimum 0.0428-inch- thick steel, finished to match cabinet.
  8. Outdoor-Air Wall Box: Minimum 0.1265-inch- thick, aluminum, rain-resistant louver and box with integral eliminators and bird screen. Aluminum louver with baked-enamel finish in color selected by Commissioner from manufacturer's standard colors.
    - a. Outdoor-Air Damper: Galvanized-steel blades with edge and end seals and nylon bearings; with electronic, two-position actuators.
- H. Filters: Minimum arrestance according to ASHRAE 52.1 and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
1. Washable Foam: 70 percent arrestance and 3 MERV.
- I. Hot-Water Coil: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 200 psig and a maximum entering-water temperature of 220 deg F. Include manual air vent and drain.
- J. Fan and Motor Board: Removable.
1. Fan: Forward curved, double width, centrifugal; directly connected to motor. Thermoplastic or painted-steel wheels, and aluminum, painted-steel, or galvanized-steel fan scrolls.
  2. Motor: Permanently lubricated, multispeed; resiliently mounted on motor board. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  3. Wiring Terminations: Connect motor to chassis wiring with plug connection.
- K. Factory, Hot-Water Piping Package: ASTM B 88, Type L copper tube with wrought-copper fittings and brazed joints. Label piping to indicate service, inlet and outlet.
1. Two-way, two-position control valve.

2. Hose Kits: Minimum 400-psig working pressure, and operating temperatures from 33 to 211 deg F. Tag hose kits to equipment designations.
    - a. Length: 24 inches.
    - b. Minimum Diameter: Equal to cabinet unit heater connection size.
  3. Two-Piece, Ball Valves: Bronze body with full-port, chrome-plated bronze ball; PTFE or TFE seats; and 600-psig minimum CWP rating and blowout-proof stem.
  4. Calibrated-Orifice Balancing Valves: Bronze body, ball type, 125-psig working pressure, 250 deg F maximum operating temperature; with calibrated orifice or venturi, connection for portable differential pressure meter with integral seals, threaded ends, and equipped with a memory stop to retain set position.
  5. Automatic Flow-Control Valve: Brass or ferrous-metal body, 300-psig working pressure at 250 deg F, with removable, corrosion-resistant, tamperproof, self-cleaning, piston-spring; factory set to maintain constant indicated flow with plus or minus 10 percent over differential pressure range of 2 to 80 psig.
  6. Y-Pattern, Hot-Water Strainers: Cast-iron body (ASTM A 126, Class B); 125-psig minimum working pressure; with threaded connections, bolted cover, perforated stainless-steel basket, and bottom drain connection. Include minimum NPS 1/2 threaded pipe and full-port ball valve in strainer drain connection.
  7. Wrought-Copper Unions: ASME B16.22.
- L. Control devices and operational sequences are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."
- M. Basic Unit Controls:
1. Control voltage transformer.
  2. Wall-mounting thermostat with the following features.
    - a. Heat-off switch.
    - b. Fan on-auto switch.
    - c. Manual fan speed switch.
    - d. Adjustable deadband.
    - e. Concealed set point.
    - f. Concealed indication.
    - g. Deg F indication.
  3. Wall-mounting temperature sensor.
  4. Unoccupied period override push button.
  5. Data entry and access port.
    - a. Input data includes room temperature, and occupied and unoccupied periods.
    - b. Output data includes room temperature, supply-air temperature, entering-water temperature, operating mode, and status.
- N. Electrical Connection: Factory wire motors and controls for a single field connection.

## 2.2 PROPELLER UNIT HEATERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Airtherm; a Mestek Company.
  2. Engineered Air Ltd.
  3. McQuay International.
  4. Rosemex Products.
  5. Ruffneck Heaters; a division of Lexa Corporation.
  6. Trane.
- C. Description: An assembly including casing, coil, fan, and motor in vertical and horizontal discharge configuration with adjustable discharge louvers.
- D. Comply with UL 2021.
- E. Comply with UL 823.
- F. Cabinet: Removable panels for maintenance access to controls.
- G. Cabinet Finish: Manufacturer's standard baked enamel applied to factory-assembled and -tested propeller unit heater before shipping.
- H. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
- I. Discharge Louver: Adjustable fin diffuser for horizontal units and conical diffuser for vertical units.
- J. General Coil Requirements: Test and rate hot-water propeller unit heater coils according to ASHRAE 33.
- K. Hot-Water Coil: Copper tube, minimum 0.025-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 200 psig and a maximum entering-water temperature of 325 deg F, with manual air vent. Test for leaks to 350 psig underwater.
- L. Hot-Water Coil: Cupronickel tube, minimum 0.031-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 400 psig and a maximum entering-water temperature of 450 deg F, with manual air vent. Test for leaks to 600 psig underwater.
- M. Hot-Water Coil: Red brass tube, minimum 0.049-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 260 psig and a maximum entering-water temperature of 390 deg F, with manual air vent. Test for leaks to 390 psig underwater.
- N. Hot-Water Coil: Steel tube, minimum 0.049-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 400 psig and a maximum entering-water temperature of 450 deg F, with manual air vent. Test for leaks to 600 psig underwater.
- O. Hot-Water Coil: Vertical steel tube, minimum 0.065-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 400 psig and a maximum entering-water temperature of 450 deg F, with steel headers at top and bottom. Test for leaks to 600 psig underwater.

- P. Steam Coil: Copper tube, minimum 0.025-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 75 psig.
- Q. Steam Coil: Red brass tube, minimum 0.049-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 75 psig.
- R. Steam Coil: Vertical steel tube, minimum 0.065-inch wall thickness, with mechanically bonded aluminum fins spaced no closer than 0.1 inch and rated for a minimum working pressure of 100 psig, with steel headers at top and bottom.
- S. Electric-Resistance Heating Elements: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in steel or corrosion-resistant metallic sheath with fins no closer than 0.16 inch. Element ends shall be enclosed in terminal box. Fin surface temperature shall not exceed 550 deg F at any point during normal operation.
  - 1. Circuit Protection: One-time fuses in terminal box for overcurrent protection and limit controls for high-temperature protection of heaters.
  - 2. Wiring Terminations: Stainless-steel or corrosion-resistant material.
- T. Fan: Propeller type with aluminum wheel directly mounted on motor shaft in the fan venturi.
- U. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  - 1. Motor Type: Permanently lubricated, multispeed.
- V. Control Devices:
  - 1. Wall-mounting, fan-speed switch.
  - 2. Thermostat.

### 2.3 WALL AND CEILING HEATERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - 1. Berko Electric Heating; a division of Marley Engineered Products.
  - 2. Chromalox, Inc.; a division of Emerson Electric Company.
  - 3. Indeco.
  - 4. Markel Products; a division of TPI Corporation.
  - 5. Marley Electric Heating; a division of Marley Engineered Products.
  - 6. Ouellet Canada Inc.
  - 7. QMark Electric Heating; a division of Marley Engineered Products.
  - 8. Trane.

- D. Description: An assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.
- E. Cabinet:
  - 1. Front Panel: Extruded-aluminum bar grille, with removable panels fastened with tamperproof fasteners.
  - 2. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Commissioner, applied to factory-assembled and -tested wall and ceiling heaters before shipping.
  - 3. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
- F. Surface-Mounting Cabinet Enclosure: Steel with finish to match cabinet.
- G. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high temperature protection. Provide integral circuit breaker for overcurrent protection.
- H. Fan: Aluminum propeller directly connected to motor.
  - 1. Motor: Permanently lubricated. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- I. Controls: Unit-mounted thermostat. Low-voltage relay with transformer kit.
- J. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas to receive unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for piping and electrical connections to verify actual locations before unit heater installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install wall boxes in finished wall assembly; seal and weatherproof. Joint-sealant materials and applications are specified in Division 07 Section "Joint Sealants."
- B. Install cabinet unit heaters to comply with NFPA 90A.
- C. Install propeller unit heaters level and plumb.

- D. Suspend cabinet unit heaters from structure with elastomeric hangers and seismic restraints. Vibration isolators and seismic restraints are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- E. Suspend propeller unit heaters from structure with all-thread hanger rods and spring hangers with vertical-limit stop. Hanger rods and attachments to structure are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment." Vibration hangers are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- F. Install wall-mounting thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.
- G. Install new filters in each fan-coil unit within two weeks of Substantial Completion.

### 3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Connect piping to cabinet unit heater's factory, hot-water piping package. Install the piping package if shipped loose.
- D. Connect supply and return ducts to cabinet unit heaters with flexible duct connectors specified in Division 23 Section "Air Duct Accessories."
- E. Comply with safety requirements in UL 1995.
- F. Unless otherwise indicated, install union and gate or ball valve on supply-water connection and union and calibrated balancing valve on return-water connection of unit heater. Hydronic specialties are specified in Division 23 Section "Hydronic Piping."
- G. Unless otherwise indicated, install union and gate or ball valve on steam-supply connection and union, strainer, steam trap, and gate or ball valve on condensate-return connection of unit heater. Steam specialties are specified in Division 23 Section "Steam and Condensate Heating Piping."
- H. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- I. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

### 3.5 ADJUSTING

- A. Adjust initial temperature set points.
- B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to Two visits to Project during other-than-normal occupancy hours for this purpose.

### 3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train City of New York's maintenance personnel to adjust, operate, and maintain cabinet unit heaters. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 238239

## SECTION 260500

### COMMON WORK RESULTS FOR ELECTRICAL

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Electrical equipment coordination and installation.
  - 2. Sleeves for raceways and cables.
  - 3. Sleeve seals.
  - 4. Grout.
  - 5. Common electrical installation requirements.

##### 1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

##### 1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

##### 1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  - 3. To allow right of way for piping and conduit installed at required slope.
  - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

## PART 2 - PRODUCTS

### 2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
  - 1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

### 2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.
  - 2. Sealing Elements: NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 3. Pressure Plates: Stainless steel. Include two for each sealing element.
  - 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### 2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

## PART 3 - EXECUTION

### 3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

### 3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
  - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

### 3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500

## SECTION 260519

### LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

- B. Related Sections include the following:

1. Division 27 Section "Communications Horizontal Cabling" for cabling used for voice and data circuits.

##### 1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

##### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

## 1.6 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

## PART 2 - PRODUCTS

### 2.1 CONDUCTORS AND CABLES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Alcan Products Corporation; Alcan Cable Division.
  - 2. American Insulated Wire Corp.; a Leviton Company.
  - 3. General Cable Corporation.
  - 4. Senator Wire & Cable Company.
  - 5. Southwire Company.
- C. Copper Conductors: Comply with NEMA WC 70.
- D. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN XHHW.
- E. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC mineral-insulated, metal-sheathed cable, Type MI nonmetallic-sheathed cable, Type NM with ground wire.

### 2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Hubbell Power Systems, Inc.
  - 3. O-Z/Gedney; EGS Electrical Group LLC.
  - 4. 3M; Electrical Products Division.
  - 5. Tyco Electronics Corp.
- C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

## 2.3 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

## 2.4 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.
  - 3. Metraflex Co.
  - 4. Pipeline Seal and Insulator, Inc.
- C. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 2. Pressure Plates: Plastic, Stainless steel. Include two for each sealing element.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-THWN, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- E. Feeders in Cable Tray: Type THHN-THWN, single conductors in raceway.
- F. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- I. Branch Circuits Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.
- J. Branch Circuits in Cable Tray: Type THHN-THWN, single conductors in raceway.
- K. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- L. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- M. Class 2 Control Circuits: Type THHN-THWN, in raceway.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

### 3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
  - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

### 3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
  - 1. For sleeve rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
  - 2. For sleeve rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both wall surfaces.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Penetration Firestopping."
- L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.
- M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

- N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

### 3.6 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground exterior-wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

### 3.8 FIELD QUALITY CONTROL

- A. Testing Agency: City of New York will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections and prepare test reports.
- C. Tests and Inspections:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
  - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
    - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- D. Test Reports: Prepare a written report to record the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.

3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

E. Remove and replace malfunctioning units and retest as specified above.

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## SECTION 260526

### GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:
  - 1. Overhead-lines grounding.
  - 2. Underground distribution grounding.
  - 3. Common ground bonding with lightning protection system.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
  - 1. Test wells.
  - 2. Ground rods.
  - 3. Ground rings.
  - 4. Grounding arrangements and connections for separately derived systems.
  - 5. Grounding for sensitive electronic equipment.
- C. Qualification Data: For testing agency and testing agency's field supervisor.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
  - 1. Instructions for periodic testing and inspection of grounding features at based on NFPA 70B with NYC amendments.
    - a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
    - b. Include recommended testing intervals.

## 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

## PART 2 - PRODUCTS

### 2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Bare Grounding Conductor and Conductor Protector for Wood Poles:
  - 1. No. 4 AWG minimum, soft-drawn copper.
  - 2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.
- D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

### 2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

## 2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 5/8 by 96 inches in diameter.
- B. Chemical-Enhanced Grounding Electrodes: Copper tube, straight or L-shaped, charged with nonhazardous electrolytic chemical salts.
1. Termination: Factory-attached No. 4/0 AWG bare conductor at least 48 inches long.
  2. Backfill Material: Electrode manufacturer's recommended material.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install barecopper conductor, No. 2/0 AWG minimum.
1. Bury at least 24 inches below grade.
  2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
  2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.
- E. Conductor Terminations and Connections:
1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
  3. Connections to Ground Rods at Test Wells: Bolted connectors.
  4. Connections to Structural Steel: Welded connectors.

### 3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.
- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.
- D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

### 3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Three-phase motor and appliance branch circuits.
  - 6. Flexible raceway runs.
  - 7. Armored and metal-clad cable runs.
  - 8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
  - 9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
  - 10. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

- D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- G. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
  - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
  - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

### 3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
  - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
  - 1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
  
- F. Grounding and Bonding for Piping:
  - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
  - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
  - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
  
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
  
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: City of New York will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
  
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
  
- C. Perform the following tests and inspections and prepare test reports:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
    - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Commissioner promptly and include recommendations to reduce ground resistance.

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## SECTION 260529

### HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Hangers and supports for electrical equipment and systems.
  - 2. Construction requirements for concrete bases.
- B. Related Sections include the following:
  - 1. Division 26 Section "Vibration And Seismic Controls For Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

##### 1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional Commissioner using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

## 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Steel slotted support systems.
  - 2. Nonmetallic slotted support systems.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer registered and in good standing in the state of New York. Show fabrication and installation details and include calculations for the following:
  - 1. Trapeze hangers. Include Product Data for components.
  - 2. Steel slotted channel systems. Include Product Data for components.
  - 3. Nonmetallic slotted channel systems. Include Product Data for components.
  - 4. Equipment supports.
- C. Welding certificates.

## 1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

## 1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

## PART 2 - PRODUCTS

### 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation.

- f. Unistrut; Tyco International, Ltd.
  - g. Wesanco, Inc.
3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  6. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
  - C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
  - D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
  - E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
  - F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
    1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
      - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        - 1) Hilti Inc.
        - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        - 3) MKT Fastening, LLC.
        - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
    2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
      - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
        - 2) Empire Tool and Manufacturing Co., Inc.
        - 3) Hilti Inc.
        - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

## 2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacing less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
  2. To New Concrete: Bolt to concrete inserts.
  3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  4. To Existing Concrete: Expansion anchor fasteners.
  5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
  7. To Light Steel: Sheet metal screws.
  8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panel boards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### 3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
  1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

### 3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

## SECTION 260533

### RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

##### 1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RNC: Rigid nonmetallic conduit.

##### 1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Custom enclosures and cabinets.
  - 2. For handholes and boxes for underground wiring, including the following:
    - a. Duct entry provisions, including locations and duct sizes.
    - b. Frame and cover design.
    - c. Grounding details.

- d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
  - e. Joint details.
- C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
- 1. Structural members in the paths of conduit groups with common supports.
  - 2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.
- D. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:
- 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will retain its enclosure characteristics, including its interior accessibility, after the seismic event."
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Qualification Data: For professional engineer and testing agency.
- F. Source quality-control test reports.

## 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

## PART 2 - PRODUCTS

### 2.1 METAL CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Alflec Inc.
  - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
  - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 5. Electri-Flex Co.

6. Manhattan/CDT/Cole-Flex.
  7. Maverick Tube Corporation.
  8. O-Z Gedney; a unit of General Signal.
  9. Wheatland Tube Company.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Aluminum Rigid Conduit: ANSI C80.5.
- D. IMC: ANSI C80.6.
- E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
  2. Coating Thickness: 0.040 inch, minimum.
- F. EMT: ANSI C80.3.
- G. FMC: Zinc-coated steel or aluminum.
- H. LFMC: Flexible steel conduit with PVC jacket.
- I. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
  2. Fittings for EMT: Steel, compression type.
  3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.
- J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

## 2.2 NONMETALLIC CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
  2. Anamet Electrical, Inc.; Anaconda Metal Hose.
  3. Arnco Corporation.
  4. CANTEX Inc.
  5. CertainTeed Corp.; Pipe & Plastics Group.
  6. Condux International, Inc.
  7. ElecSYS, Inc.
  8. Electri-Flex Co.
  9. Lamson & Sessions; Carlon Electrical Products.
  10. Manhattan/CDT/Cole-Flex.
  11. RACO; a Hubbell Company.
  12. Thomas & Betts Corporation.
- B. ENT: NEMA TC 13.

- C. RNC: NEMA TC 2, unless otherwise indicated.
- D. LFNC: UL 1660.
- E. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- F. Fittings for LFNC: UL 514B.

### 2.3 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Arnco Corporation.
  - 2. Endot Industries Inc.
  - 3. IPEX Inc.
  - 4. Lamson & Sessions; Carlon Electrical Products.
- C. Description: Comply with UL 2024; flexible type, approved for riser installation.

### 2.4 METAL WIREWAYS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper B-Line, Inc.
  - 2. Hoffman.
  - 3. Square D; Schneider Electric.
- C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- E. Wireway Covers: Hinged type.
- F. Finish: Manufacturer's standard enamel finish.

### 2.5 NONMETALLIC WIREWAYS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hoffman.
  - 2. Lamson & Sessions; Carlon Electrical Products.
- C. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.
- D. Description: PVC plastic extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.
- E. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

## 2.6 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Commissioner.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Thomas & Betts Corporation.
    - b. Walker Systems, Inc.; Wiremold Company (The).
    - c. Wiremold Company (The); Electrical Sales Division.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Commissioner from manufacturer's standard colors.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Butler Manufacturing Company; Walker Division.
    - b. Enduro Systems, Inc.; Composite Products Division.
    - c. Hubbell Incorporated; Wiring Device-Kellems Division.
    - d. Lamson & Sessions; Carlon Electrical Products.
    - e. Panduit Corp.
    - f. Walker Systems, Inc.; Wiremold Company (The).
    - g. Wiremold Company (The); Electrical Sales Division.

## 2.7 BOXES, ENCLOSURES, AND CABINETS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
  - 2. EGS/Appleton Electric.
  - 3. Erickson Electrical Equipment Company.
  - 4. Hoffman.
  - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
  - 6. O-Z/Gedney; a unit of General Signal.
  - 7. RACO; a Hubbell Company.
  - 8. Robroy Industries, Inc.; Enclosure Division.
  - 9. Scott Fetzer Co.; Adalet Division.
  - 10. Spring City Electrical Manufacturing Company.
  - 11. Thomas & Betts Corporation.
  - 12. Walker Systems, Inc.; Wiremold Company (The).
  - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- C. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- D. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- F. Metal Floor Boxes: Cast metal, rectangular.
- G. Nonmetallic Floor Boxes: Nonadjustable, round.
- H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- I. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- J. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Nonmetallic Enclosures: Plastic.
- K. Cabinets:
  - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  - 2. Hinged door in front cover with flush latch and concealed hinge.
  - 3. Key latch to match panel boards.
  - 4. Metal barriers to separate wiring of different systems and voltage.
  - 5. Accessory feet where required for freestanding equipment.

## 2.8 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

## 2.9 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.
  - 3. Metraflex Co.
  - 4. Pipeline Seal and Insulator, Inc.
- C. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  - 1. Sealing Elements: NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 2. Pressure Plates: Stainless steel. Include two for each sealing element.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.10 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

- A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
  - 1. Tests of materials shall be performed by a independent testing agency.
  - 2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional Commissioner shall certify tests by manufacturer.
  - 3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

## PART 3 - EXECUTION

### 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
1. Exposed Conduit: Rigid steel conduit.
  2. Concealed Conduit, Aboveground: Rigid steel conduit, EMT.
  3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Comply with the following indoor applications, unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT or RNC.
  2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
    - a. Loading dock.
    - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    - c. Mechanical rooms.
  3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  5. Damp or Wet Locations: Rigid steel conduit.
  6. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway.
  7. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: Riser-type, optical fiber/communications cable raceway.
  8. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: General-use, optical fiber/communications cable raceway.
  9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 1/2-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
  2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- F. Do not install aluminum conduits in contact with concrete.

## 3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:
  - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
  - 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
  - 1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
  - 2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
  - 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where otherwise required by NFPA 70.
- N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
    - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
    - c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
  2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
  3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semi recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
  2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- Q. Set metal floor boxes level and flush with finished floor surface.
- R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

### 3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
  2. Install backfill as specified in Division 31 Section "Earth Moving."
  3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
  4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.

5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
  - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

### 3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes and boxes with bottom below the frost line, Insert depth of frost line below grade at Project site below grade.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.
- F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

### 3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
  1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
  2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."
- L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

### 3.6 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

### 3.8 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

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## SECTION 260548

### VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:

1. Isolation pads.
2. Spring isolators.
3. Restrained spring isolators.
4. Channel support systems.
5. Restraint cables.
6. Hanger rod stiffeners.
7. Anchorage bushings and washers.

- B. Related Sections include the following:

1. Division 26 Section "Hangers And Supports For Electrical Systems" for commonly used electrical supports and installation requirements.

##### 1.3 DEFINITIONS

- A. The IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:

1. Site Class as Defined in the NYC Building Code, Local Law 17/95: 1.0
2. Assigned Seismic Use Group or Building Category as Defined in the NYC Building Code, Local Law 17/95: IV

##### 1.5 SUBMITTALS

- A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.

2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
    - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
    - b. Annotate to indicate application of each product submitted and compliance with requirements.
  3. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.
- B. Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.
    - a. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other Division 26 Sections for equipment mounted outdoors.
  2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
  3. Field-fabricated supports.
  4. Seismic-Restraint Details:
    - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    - c. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).
- C. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.
- D. Welding certificates.
- E. Qualification Data: For professional engineer and testing agency.
- F. Field quality-control test reports.

## 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
- E. Comply with NFPA 70 with NYC Amendments.

## PART 2 - PRODUCTS

### 2.1 VIBRATION ISOLATORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ace Mountings Co., Inc.
  - 2. Amber/Booth Company, Inc.
  - 3. California Dynamics Corporation.
  - 4. Isolation Technology, Inc.
  - 5. Kinetics Noise Control.
  - 6. Mason Industries.
  - 7. Vibration Eliminator Co., Inc.
  - 8. Vibration Isolation.
  - 9. Vibration Mountings & Controls, Inc.
- C. Pads: Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel base plates, and factory cut to sizes that match requirements of supported equipment.
- D. Spring Isolators: Freestanding, laterally stable, open-spring isolators.
  - 1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  - 2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  - 3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  - 4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  - 5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig.
  - 6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

- E. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.
1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
  2. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
  3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

## 2.2 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Amber/Booth Company, Inc.
  2. California Dynamics Corporation.
  3. Cooper B-Line, Inc.; a division of Cooper Industries.
  4. Hilti Inc.
  5. Loos & Co.; Seismic Earthquake Division.
  6. Mason Industries.
  7. TOLCO Incorporated; a brand of NIBCO INC.
  8. Unistrut; Tyco International, Ltd.
- B. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an evaluation service member of ICC-ES.
1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- D. Restraint Cables: ASTM A 492 stainless-steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Do not weld stiffeners to rods.
- F. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.

- G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.
- H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- I. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
- J. Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

## 2.3 FACTORY FINISHES

- A. Finish: Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
  - 1. Powder coating on springs and housings.
  - 2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
  - 3. Baked enamel or powder coat for metal components on isolators for interior use.
  - 4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLICATIONS

- A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

### 3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

#### A. Equipment and Hanger Restraints:

1. Install restrained isolators on electrical equipment.
2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

#### B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

#### C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

#### D. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural Commissioner if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

### 3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with The City of New York, through Commissioner, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
3. Obtain Commissioner's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

### 3.6 ADJUSTING

- A. Adjust isolators after isolated equipment is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust restraints to permit free movement of equipment within normal mode of operation.

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## SECTION 260553

### IDENTIFICATION FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Identification for raceways.
  - 2. Identification of power and control cables.
  - 3. Identification for conductors.
  - 4. Underground-line warning tape.
  - 5. Warning labels and signs.
  - 6. Instruction signs.
  - 7. Equipment identification labels.
  - 8. Miscellaneous identification products.

##### 1.3 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

##### 1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70 with NYC Amendments.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

## 1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

## PART 2 - PRODUCTS

### 2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system or service type.
- C. Colors for Raceways Carrying Circuits at More Than 600 V:
  - 1. Black letters on an orange field.
  - 2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- high letters on 20-inch centers.
- D. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- E. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- G. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- wide black stripes on 10-inch centers diagonally over orange background that extends full length of raceway or duct and is 12 inches wide. Stop stripes at legends.
- H. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- I. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

## 2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Colors for Raceways Carrying Circuits at 600 V and Less:
  1. Black letters on an orange field.
  2. Legend: Indicate voltage and system or service type.
- C. Colors for Raceways Carrying Circuits at More Than 600 V:
  1. Black letters on an orange field.
  2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- high letters on 20-inch centers.
- D. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- E. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

## 2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
  2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.
- E. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

- F. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

## 2.4 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- F. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
  - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

## 2.5 FLOOR MARKING TAPE

- A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

## 2.6 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Baked-Enamel Warning Signs:
  - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
  - 2. 1/4-inch grommets in corners for mounting.
  - 3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

## 2.7 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

## 2.8 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

## 2.9 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
  - 3. UL 94 Flame Rating: 94V-0.
  - 4. Temperature Range: Minus 50 to plus 284 deg F.
  - 5. Color: Black.

## 2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

- F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
  - 1. Outdoors: UV-stabilized nylon.
  - 2. In Spaces Handling Environmental Air: Plenum rated.
- I. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

### 3.2 IDENTIFICATION SCHEDULE

- A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch-wide black stripes on 10-inch centers over orange background that extends full length of raceway or duct and is 12 inches wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch-high black letters on 20-inch centers. Stop stripes at legends. Apply to the following finished surfaces:
  - 1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
  - 2. Wall surfaces directly external to raceways concealed within wall.
  - 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- B. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 10-foot maximum intervals.
- C. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
  - 1. Emergency Power.
  - 2. Power.
  - 3. UPS.
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded branch-circuit conductors.
    - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    - b. Colors for 208/120-V Circuits:

- 1) Phase A: Black.
  - 2) Phase B: Red.
  - 3) Phase C: Blue.
- c. Colors for 480/277-V Circuits:
- 1) Phase A: Brown.
  - 2) Phase B: Orange.
  - 3) Phase C: Yellow.
- d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- E. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- F. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- H. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
1. Limit use of underground-line warning tape to direct-buried cables.
  2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- I. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
  2. Identify system voltage with black letters on an orange background.
  3. Apply to exterior of door, cover, or other access.
  4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.

- K. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- L. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.
- M. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
  - 1. Labeling Instructions:
    - a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
    - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
    - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
  - 2. Equipment to Be Labeled:
    - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
    - b. Enclosures and electrical cabinets.
    - c. Access doors and panels for concealed electrical items.
    - d. Switchgear.
    - e. Switchboards.
    - f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
    - g. Substations.
    - h. Emergency system boxes and enclosures.
    - i. Motor-control centers.
    - j. Enclosed switches.
    - k. Enclosed circuit breakers.
    - l. Enclosed controllers.
    - m. Variable-speed controllers.
    - n. Push-button stations.
    - o. Power transfer equipment.
    - p. Contactors.
    - q. Remote-controlled switches, dimmer modules, and control devices.
    - r. Battery-inverter units.
    - s. Battery racks.
    - t. Power-generating units.
    - u. Monitoring and control equipment.
    - v. UPS equipment.

END OF SECTION 260553

## SECTION 260573

### OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes computer-based, fault-current and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.

- 1. Coordination of series-rated devices is permitted where indicated on Drawings.

##### 1.3 SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399.
- C. Qualification Data: For coordination-study specialist.
- D. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals shall be in digital form.
  - 1. Coordination-study input data, including completed computer program input data sheets.
  - 2. Study and Equipment Evaluation Reports.
  - 3. Coordination-Study Report.

##### 1.4 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.
- B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
  - 1. Professional engineer, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.

- C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.
- D. Comply with IEEE 399 for general study procedures.

## PART 2 - PRODUCTS

### 2.1 COMPUTER SOFTWARE DEVELOPERS

- A. Available Computer Software Developers: Subject to compliance with requirements, companies offering computer software programs that may be used in the Work include, but are not limited to, the following:
- B. Computer Software Developers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CGI CYME.
  - 2. EDSA Micro Corporation.
  - 3. ESA Inc.
  - 4. Operation Technology, Inc.
  - 5. SKM Systems Analysis, Inc.

### 2.2 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

- A. Comply with IEEE 399.
- B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.
  - 1. Optional Features:
    - a. Arcing faults.
    - b. Simultaneous faults.
    - c. Explicit negative sequence.
    - d. Mutual coupling in zero sequence.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

### 3.2 POWER SYSTEM DATA

#### A. Gather and tabulate the following input data to support coordination study:

1. Product Data for overcurrent protective devices specified in other Division 26 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Impedance of utility service entrance.
3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:
  - a. Circuit-breaker and fuse-current ratings and types.
  - b. Relays and associated power and current transformer ratings and ratios.
  - c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
  - d. Generator kilovolt amperes, size, voltage, and source impedance.
  - e. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.
  - f. Busway ampacity and impedance.
  - g. Motor horsepower and code letter designation according to NEMA MG 1.
4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
  - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
  - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
  - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
  - d. Generator thermal-damage curve.
  - e. Ratings, types, and settings of utility company's overcurrent protective devices.
  - f. Special overcurrent protective device settings or types stipulated by utility company.
  - g. Time-current-characteristic curves of devices indicated to be coordinated.
  - h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
  - i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
  - j. Panelboards, switchboards, motor-control center ampacity, and interrupting rating in amperes rms symmetrical.

### 3.3 FAULT-CURRENT STUDY

- A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit at each of the following:
1. Switchgear and switchboard bus.
  2. Medium-voltage controller.
  3. Motor-control center.
  4. Distribution panelboard.
  5. Branch circuit panelboard.
- B. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.
- C. Calculate momentary and interrupting duties on the basis of maximum available fault current.
- D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 141 IEEE 241 and IEEE 242.
1. Transformers:
    - a. ANSI C57.12.10.
    - b. ANSI C57.12.22.
    - c. ANSI C57.12.40.
    - d. IEEE C57.12.00.
    - e. IEEE C57.96.
  2. Medium-Voltage Circuit Breakers: IEEE C37.010.
  3. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
  4. Low-Voltage Fuses: IEEE C37.46.
- E. Study Report:
1. Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.
  2. Show interrupting (5-cycle) and time-delayed currents (6 cycles and above) on medium-voltage breakers as needed to set relays and assess the sensitivity of overcurrent relays.
- F. Equipment Evaluation Report:
1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
  2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
  3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

### 3.4 COORDINATION STUDY

- A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.
  - 1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.
  - 2. Calculate the maximum and minimum interrupting duty (5 cycles to 2 seconds) short-circuit currents.
  - 3. Calculate the maximum and minimum ground-fault currents.
- B. Comply with IEEE 141 IEEE 241 IEEE 242 recommendations for fault currents and time intervals.
- C. Transformer Primary Overcurrent Protective Devices:
  - 1. Device shall not operate in response to the following:
    - a. Inrush current when first energized.
    - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
    - c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
  - 2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.
- D. Motors served by voltages more than 600 V shall be protected according to IEEE 620.
- E. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- F. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:
  - 1. Tabular Format of Settings Selected for Overcurrent Protective Devices:
    - a. Device tag.
    - b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.
    - c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
    - d. Fuse-current rating and type.
    - e. Ground-fault relay-pickup and time-delay settings.
  - 2. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:
    - a. Device tag.
    - b. Voltage and current ratio for curves.

- c. Three-phase and single-phase damage points for each transformer.
- d. No damage, melting, and clearing curves for fuses.
- e. Cable damage curves.
- f. Transformer inrush points.
- g. Maximum fault-current cutoff point.

G. Completed data sheets for setting of overcurrent protective devices.

END OF SECTION 260573

## SECTION 262413

### SWITCHBOARDS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Transient voltage suppression devices.
3. Disconnecting and overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.
7. Identification.
8. Mimic bus.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Switchboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

##### 1.4 SUBMITTALS

- A. Product Data: For each type of switchboard, overcurrent protective device, transient voltage suppression device, ground-fault protector, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

- B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Detail utility company's metering provisions with indication of approval by utility company.
7. Include evidence of NRTL listing for series rating of installed devices.
8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

9. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
10. Include diagram and details of proposed mimic bus.
11. Include schematic and wiring diagrams for power, signal, and control wiring.

C. Samples: Representative portion of mimic bus with specified material and finish, for color selection.

D. Qualification Data: For qualified Installer.

E. Seismic Qualification Certificates: Submit certification that switchboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

G. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in the general conditions and amendments thereto include the following:

1. Routine maintenance requirements for switchboards and all installed components.
2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
3. Time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

## 1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers qualified as defined in NEMA PB 2.1 and trained in electrical safety as required by NFPA 70E.

B. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NEMA PB 2.

F. Comply with NFPA 70.

- G. Comply with UL 891.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.
- B. Remove loose packing and flammable materials from inside switchboards and install temporary electric heating (250 W per section), or connect factory-installed space heaters to temporary electrical service to prevent condensation.
- C. Handle and prepare switchboards for installation according to NECA 400.

#### 1.7 PROJECT CONDITIONS

- A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.
- B. Environmental Limitations:
  - 1. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
  - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
    - a. Ambient Temperature: Not exceeding 104 deg F.
    - b. Altitude: Not exceeding 6600 feet.
- C. Service Conditions: NEMA PB 2, usual service conditions, as follows:
  - 1. Ambient temperatures within limits specified.
  - 2. Altitude not exceeding 6600 feet.
- D. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by The City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
  - 1. Notify Commissioner no fewer than seven days in advance of proposed interruption of electric service.
  - 2. Indicate method of providing temporary electric service.
  - 3. Do not proceed with interruption of electric service without the City of New York's written permission.
  - 4. Comply with NFPA 70E.

#### 1.8 COORDINATION

- A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

## 1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

## 1.10 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Potential Transformer Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
2. Control-Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
3. Fuses and Fusible Devices for Fused Circuit Breakers: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
4. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
5. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
6. Indicating Lights: Equal to 10 percent of quantity installed for each size and type, but no fewer than one of each size and type.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURED UNITS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

- B. Front-Connected, Front-Accessible Switchboards:

1. Main Devices: Panel mounted.
2. Branch Devices: Panel mounted.
3. Sections front and rear aligned.

- C. Nominal System Voltage: 208Y/120 V.

- D. Main-Bus Continuous: 800 A.

- E. Seismic Requirements: Fabricate and test switchboards according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

- F. Indoor Enclosures: Steel, NEMA 250, Type 1.

- G. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.

- H. Barriers: Between adjacent switchboard sections.
- I. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.
- J. Utility Metering Compartment: Fabricated, barrier compartment and section complying with utility company's requirements; hinged sealed door; buses provisioned for mounting utility company's current transformers and potential transformers or potential taps as required by utility company. If separate vertical section is required for utility metering, match and align with basic switchboard. Provide service entrance label and necessary applicable service entrance features.
- K. Customer Metering Compartment: A separate customer metering compartment and section with front hinged door, for indicated metering, and current transformers for each meter. Current transformer secondary wiring shall be terminated on shorting-type terminal blocks.
- L. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.
- M. Removable, Hinged Rear Doors and Compartment Covers: Secured by captive thumb screws, for access to rear interior of switchboard.
- N. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.
- O. Pull Box on Top of Switchboard:
  1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.
  2. Set back from front to clear circuit-breaker removal mechanism.
  3. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.
  4. Bottom shall be insulating, fire-resistive material with separate holes for cable drops into switchboard.
  5. Cable supports shall be arranged to facilitate cabling and adequate to support cables indicated, including those for future installation.
- P. Buses and Connections: Three phase, four wire unless otherwise indicated.
  1. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity, silver-plated, with tin-plated aluminum or copper feeder circuit-breaker line connections.
  2. Ground Bus: Minimum-size required by UL 891, hard-drawn copper of 98 percent conductivity, equipped with mechanical connectors for feeder and branch-circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
  3. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
  4. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
  5. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.
- Q. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.
- R. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.
- S. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components including instruments and instrument transformers.

## 2.2 TRANSIENT VOLTAGE SUPPRESSION DEVICES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  3. Siemens Energy & Automation, Inc.
  4. Square D; a brand of Schneider Electric.
- B. Surge Protection Device Description: IEEE C62.41-compliant, integrally mounted, bolt-on, solid-state, parallel-connected, modular (with field-replaceable modules) type, with sine-wave tracking suppression and filtering modules, UL 1449, second edition, short-circuit current rating matching or exceeding the switchboard short-circuit rating, and with the following features and accessories:
1. Fuses, rated at 200-kA interrupting capacity.
  2. Fabrication using bolted compression lugs for internal wiring.
  3. Integral disconnect switch.
  4. Redundant suppression circuits.
  5. Redundant replaceable modules.
  6. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
  7. LED indicator lights for power and protection status.
  8. Audible alarm, with silencing switch, to indicate when protection has failed.
  9. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of system operation. Contacts shall reverse position on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
  10. Four-digit, transient-event counter set to totalize transient surges.
- C. Peak Single-Impulse Surge Current Rating: 160 kA per mode/320 kA per phase.
- D. Withstand Capabilities: 12,000 IEEE C62.41, Category C3 (10 kA), 8-by-20-mic.sec. surges with less than 5 percent change in clamping voltage.
- E. Protection modes and UL 1449 SVR for grounded wye circuits with 208Y/120-V, three-phase, four-wire circuits shall be as follows:
1. Line to Neutral: 400 V for 208Y/120.
  2. Line to Ground: 400 V for 208Y/120.
  3. Neutral to Ground: 400 V for 208Y/120.

## 2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
  2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
  3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replaceable electronic trip; and the following field-adjustable settings:
    - a. Instantaneous trip.
    - b. Long- and short-time pickup levels.

- c. Long- and short-time time adjustments.
  - d. Ground-fault pickup level, time delay, and I<sup>2</sup>t response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
  5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
  6. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
  7. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
  8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
    - a. Standard frame sizes, trip ratings, and number of poles.
    - b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor material.
    - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    - d. Ground-Fault Protection: Remote-mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
    - e. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
    - f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
    - g. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
    - h. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.

B. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

C. Fuses are specified in Division 26 Section "Fuses."

## 2.4 INSTRUMENTATION

A. Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four-wire systems and with the following features:

1. Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated:
  - a. Phase Currents, Each Phase: Plus or minus 1 percent.
  - b. Phase-to-Phase Voltages, Three Phase: Plus or minus 1 percent.
  - c. Phase-to-Neutral Voltages, Three Phase: Plus or minus 1 percent.
  - d. Megawatts: Plus or minus 2 percent.
  - e. Megavars: Plus or minus 2 percent.
  - f. Power Factor: Plus or minus 2 percent.
  - g. Frequency: Plus or minus 0.5 percent.
  - h. Accumulated Energy, Megawatt Hours: Plus or minus 2 percent; accumulated values unaffected by power outages up to 72 hours.
  - i. Megawatt Demand: Plus or minus 2 percent; demand interval programmable from five to 60 minutes.
  - j. Contact devices to operate remote impulse-totalizing demand meter.

2. Mounting: Display and control unit flush or semiflush mounted in instrument compartment door.

B. Ammeters, Voltmeters, and Power-Factor Meters: ANSI C39.1.

1. Meters: 4-inch diameter or 6 inches square, flush or semiflush, with antiparallax 250-degree scales and external zero adjustment.
2. Voltmeters: Cover an expanded-scale range of nominal voltage plus 10 percent.

C. Instrument Switches: Rotary type with off position.

1. Voltmeter Switches: Permit reading of all phase-to-phase voltages and, where a neutral is indicated, phase-to-neutral voltages.
2. Ammeter Switches: Permit reading of current in each phase and maintain current-transformer secondaries in a closed-circuit condition at all times.

D. Feeder Ammeters: 2-1/2-inch minimum size with 90- or 120-degree scale. Meter and transfer device with off position, located on overcurrent device door for indicated feeder circuits only.

E. Watt-Hour Meters and Wattmeters:

1. Comply with ANSI C12.1.
2. Three-phase induction type with two stators, each with current and potential coil, rated 5 A, 120 V, 60 Hz.
3. Suitable for connection to three- and four-wire circuits.
4. Potential indicating lamps.
5. Adjustments for light and full load, phase balance, and power factor.
6. Four-dial clock register.
7. Integral demand indicator.
8. Contact devices to operate remote impulse-totalizing demand meter.
9. Ratchets to prevent reverse rotation.
10. Removable meter with drawout test plug.
11. Semiflush mounted case with matching cover.
12. Appropriate multiplier tag.

F. Impulse-Totalizing Demand Meter:

1. Comply with ANSI C12.1.
2. Suitable for use with switchboard watt-hour meter, including two-circuit totalizing relay.
3. Cyclometer.
4. Four-dial, totalizing kilowatt-hour register.
5. Positive chart drive mechanism.
6. Capillary pen holding a minimum of one month's ink supply.
7. Roll chart with minimum 31-day capacity; appropriate multiplier tag.
8. Capable of indicating and recording five-minute integrated demand of totalized system.

## 2.5 CONTROL POWER

- A. Control Circuits: 120-V ac, supplied through secondary disconnecting devices from control-power transformer.
- B. Control Circuits: 120-V ac, supplied from remote branch circuit.
- C. Control Circuits: 24-V dc.

- D. Electrically Interlocked Main and Tie Circuit Breakers: Two control-power transformers in separate compartments, with interlocking relays, connected to the primary side of each control-power transformer at the line side of the associated main circuit breaker. 120-V secondaries connected through automatic transfer relays to ensure a fail-safe automatic transfer scheme.
- E. Control-Power Fuses: Primary and secondary fuses for current-limiting and overload protection of transformer and fuses for protection of control circuits.
- F. Control Wiring: Factory installed, with bundling, lacing, and protection included. Provide flexible conductors for No. 8 AWG and smaller, for conductors across hinges, and for conductors for interconnections between shipping units.

## 2.6 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.
- C. Portable Circuit-Breaker Lifting Device: Floor-supported, roller-based, elevating carriage arranged for movement of circuit breakers in and out of compartments for present and future circuit breakers.
- D. Overhead Circuit-Breaker Lifting Device: Mounted at top front of switchboard, with hoist and lifting yokes matching each drawout circuit breaker.
- E. Spare-Fuse Cabinet: Suitably identified, wall-mounted, lockable, compartmented steel box or cabinet. Arrange for wall mounting.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Receive, inspect, handle, and store switchboards according to NECA 400.
- B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.
- C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install switchboards and accessories according to NECA 400.
- B. Equipment Mounting: Install switchboards on concrete base, 4-inch nominal thickness. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete."
  1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
  2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  4. Install anchor bolts to elevations required for proper attachment to switchboards.
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.
  - D. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
  - E. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
  - F. Install filler plates in unused spaces of panel-mounted sections.
  - G. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.
    1. Set field-adjustable switches and circuit-breaker trip ranges.
  - H. Install spare-fuse cabinet.
  - I. Comply with NECA 1.
- 3.3 IDENTIFICATION
- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
  - B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
  - C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- 3.4 FIELD QUALITY CONTROL
- A. Testing Agency: The City of New York will engage a qualified testing agency to perform tests and inspections.
  - B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
  - C. Perform tests and inspections.
    1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
  - D. Acceptance Testing Preparation:
    1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:
  - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
  - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
  - c. Instruments and Equipment:
    - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Switchboard will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Overcurrent Protective Device Coordination Study."

3.6 PROTECTION

- A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train The City of New York's maintenance personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories, and to use and reprogram microprocessor-based trip, monitoring, and communication units.

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## SECTION 262416

### PANELBOARDS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Load centers.
4. Electronic-grade panelboards.

##### 1.3 DEFINITIONS

- A. SVR: Suppressed voltage rating.
- B. TVSS: Transient voltage surge suppressor.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

##### 1.5 SUBMITTALS

- A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
  1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
  2. Detail enclosure types and details for types other than NEMA 250, Type 1.
  3. Detail bus configuration, current, and voltage ratings.

4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.
8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device.

C. Qualification Data: For qualified testing agency.

D. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

F. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

G. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in the general conditions and amendments thereto include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

## 1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Comply with NEMA PB 1.

- E. Comply with NFPA 70.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NEMA PB 1.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations:

- 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
  - a. Ambient Temperature: Not exceeding 23 deg F to plus 104 deg F.
  - b. Altitude: Not exceeding 6600 feet.

- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

- 1. Ambient temperatures within limits specified.
- 2. Altitude not exceeding 6600 feet.

- C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by The City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

- 1. Notify Commissioner, Construction, and Manager Owner no fewer than two days in advance of proposed interruption of electric service.
- 2. Do not proceed with interruption of electric service without The City of New York's written permission.
- 3. Comply with NFPA 70E.

#### 1.9 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

## 1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

## 1.11 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Two spares for each type of panelboard cabinet lock.
2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: Two spares for each panelboard.
3. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
4. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

- B. Enclosures: Flush- and surface-mounted cabinets.

1. Rated for environmental conditions at installed location.
  - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
  - b. Outdoor Locations: NEMA 250, Type 3R.
  - c. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 5.
2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
6. Finishes:
  - a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
  - b. Back Boxes: Same finish as panels and trim.

- c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
- 7. Directory Card: Inside panelboard door, mounted in transparent card holder.
- C. Incoming Mains Location: Top and bottom.
- D. Phase, Neutral, and Ground Buses:
  - 1. Material: Tin-plated aluminum.
  - 2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
  - 3. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
  - 4. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
  - 5. Split Bus: Vertical buses divided into individual vertical sections.
- E. Conductor Connectors: Suitable for use with conductor material and sizes.
  - 1. Material: Tin-plated aluminum.
  - 2. Main and Neutral Lugs: Compression type.
  - 3. Ground Lugs and Bus-Configured Terminators: Compression type.
  - 4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
  - 5. Subfeed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
  - 6. Gutter-Tap Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
  - 7. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
- F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.
- G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- H. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.
- I. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

## 2.2 DISTRIBUTION PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.

- 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, power and feeder distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
  - 1. For doors more than 36 inches high, provide two latches, keyed alike.
- D. Mains: Circuit breaker.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.
- G. Branch Overcurrent Protective Devices: Fused switches.
- H. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
  - 1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
  - 2. External Control-Power Source: 120-V branch circuit.

### 2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: Circuit breaker.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
  - 1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
  - 2. External Control-Power Source: 120-V branch circuit.
- F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
- G. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

## 2.4 LOAD CENTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Load Centers: Comply with UL 67.
- C. Mains: Circuit breaker.
- D. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.
- E. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

## 2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
  - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
  - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
  - 3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:
    - a. Instantaneous trip.
    - b. Long- and short-time pickup levels.
    - c. Long- and short-time time adjustments.
    - d. Ground-fault pickup level, time delay, and  $I^2t$  response.
  - 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
  - 5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
  - 6. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
  - 7. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
  - 8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

- a. Standard frame sizes, trip ratings, and number of poles.
- b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
- c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
- d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
- e. Communication Capability: Circuit-breaker-mounted communication module with functions and features compatible with power monitoring and control system specified in Division 26 Section "Electrical Power Monitoring and Control."
- f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
- g. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay.
- h. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
- i. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function with other upstream or downstream devices.
- j. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
- k. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
- l. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

- 1. Fuses, and Spare-Fuse Cabinet: Comply with requirements specified in Division 26 Section "Fuses."
- 2. Fused Switch Features and Accessories: Standard ampere ratings and number of poles.
- 3. Auxiliary Contacts: Two normally open and normally closed contact(s) that operate with switch handle operation.

## 2.6 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- C. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- D. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- E. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- F. Install overcurrent protective devices and controllers not already factory installed.
  - 1. Set field-adjustable, circuit-breaker trip ranges.
- G. Install filler plates in unused spaces.
- H. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.
- I. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- J. Comply with NECA 1.

### 3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate The City of New York's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: The City of New York will engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- E. Tests and Inspections:
  - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
  - 3. Perform the following infrared scan tests and inspections and prepare reports:
    - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
    - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
    - c. Instruments and Equipment:
      - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- F. Panelboards will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.5 ADJUSTING

- A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Overcurrent Protective Device Coordination Study."

- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
1. Measure as directed during period of normal system loading.
  2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
  3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
  4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

### 3.6 PROTECTION

- A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 262416

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## SECTION 262726

### WIRING DEVICES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Receptacles with integral surge suppression units.
4. Wall-box motion sensors.
5. Isolated-ground receptacles.
6. Snap switches and wall-box dimmers.
7. Solid-state fan speed controls.
8. Wall-switch and exterior occupancy sensors.
9. Communications outlets.
10. Pendant cord-connector devices.
11. Cord and plug sets.
12. Floor service outlets, poke-through assemblies, service poles, and multi-outlet assemblies.

- B. Related Sections include the following:

1. Division 27 Section "Communications Horizontal Cabling" for workstation outlets.

##### 1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. TVSS: Transient voltage surge suppressor.
- F. UTP: Unshielded twisted pair.

##### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

- C. Samples: One for each type of device and wall plate specified, in each color specified.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70 with NYC Amendments.

#### 1.6 COORDINATION

- A. Receptacles for The City of New York -Furnished Equipment: Match plug configurations.
  - 1. Cord and Plug Sets: Match equipment requirements.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
  - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
  - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
  - 3. Leviton Mfg. Company Inc. (Leviton).
  - 4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

#### 2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 5351 (single), 5352 (duplex).
    - b. Hubbell; HBL5351 (single), CR5352 (duplex).
    - c. Leviton; 5891 (single), 5352 (duplex).
    - d. Pass & Seymour; 5381 (single), 5352 (duplex).
- B. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
  - a. Hubbell; CR 5253IG.
  - b. Leviton; 5362-IG.
  - c. Pass & Seymour; IG6300.
3. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

### 2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
  1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; GF20.
    - b. Pass & Seymour; 2084.

### 2.4 TWIST-LOCKING RECEPTACLES

- A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498.
  1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; L520R.
    - b. Hubbell; HBL2310.
    - c. Leviton; 2310.
    - d. Pass & Seymour; L520-R.
- B. Isolated-Ground, Single Convenience Receptacles, 125 V, 20 A:
  1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Hubbell; IG2310.
    - b. Leviton; 2310-IG.
  3. Description: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

## 2.5 PENDANT CORD-CONNECTOR DEVICES

- A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade.
1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.
  2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

## 2.6 CORD AND PLUG SETS

- A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
  2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

## 2.7 SNAP SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
    - b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
    - c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
    - d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).
- C. Pilot Light Switches, 20 A:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 2221PL for 120 V and 277 V.
    - b. Hubbell; HPL1221PL for 120 V and 277 V.
    - c. Leviton; 1221-PLR for 120 V, 1221-7PLR for 277 V.
    - d. Pass & Seymour; PS20AC1-PLR for 120 V.
  3. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."
- D. Key-Operated Switches, 120/277 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 2221L.
    - b. Hubbell; HBL1221L.
    - c. Leviton; 1221-2L.
    - d. Pass & Seymour; PS20AC1-L.
  3. Description: Single pole, with factory-supplied key in lieu of switch handle.
- E. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 1995.
    - b. Hubbell; HBL1557.
    - c. Leviton; 1257.
    - d. Pass & Seymour; 1251.
- F. Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 1995L.
    - b. Hubbell; HBL1557L.
    - c. Leviton; 1257L.
    - d. Pass & Seymour; 1251L.

## 2.8 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.
- C. Incandescent Lamp Dimmers: 120 V; control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.
  1. 600 W; dimmers shall require no derating when ganged with other devices. Illuminated when "OFF."
- D. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.

## 2.9 FAN SPEED CONTROLS

- A. Modular, 120-V, full-wave, solid-state units with integral, quiet on-off switches and audible frequency and EMI/RFI filters. Comply with UL 1917.
  - 1. Continuously adjustable rotary knob, 5 A.
  - 2. Three-speed adjustable rotary knob, 1.5 A.

## 2.10 OCCUPANCY SENSORS

- A. Refer to electrical drawing legend for occupancy sensor specification.

## 2.11 LOW VOLTAGE SWITCHES

- A. Refer to electrical drawing legend for occupancy sensor specification.

## 2.12 COMMUNICATIONS OUTLETS

- A. Telephone Outlet:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 3560-6.
    - b. Leviton; 40649.
  - 3. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e. Comply with UL 1863.

## 2.13 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: 0.035-inch- thick, satin-finished stainless steel.
  - 3. Material for Unfinished Spaces: Galvanized steel.
  - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover.

## 2.14 FLOOR SERVICE FITTINGS

- A. Type: Modular, flush-type, dual-service units suitable for wiring method used.
- B. Compartments: Barrier separates power from voice and data communication cabling.
- C. Service Plate: Rectangular, die-cast aluminum with satin finish.
- D. Power Receptacle: NEMA WD 6 configuration 5-20R, gray finish, unless otherwise indicated.

## 2.15 MULTIOUTLET ASSEMBLIES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hubbell Incorporated; Wiring Device-Kellems.
  - 2. Wiremold Company (The).
- C. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
- D. Raceway Material: Metal, with manufacturer's standard finish or PVC.
- E. Wire: No. 12 AWG.

## 2.16 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
  - 1. Wiring Devices Connected to Normal Power System: As selected by Commissioner unless otherwise indicated or required by NFPA 70 or device listing.
  - 2. Wiring Devices Connected to Emergency Power System: Red.
  - 3. TVSS Devices: Blue.
  - 4. Isolated-Ground Receptacles: As specified above, with orange triangle on face.

## 2.17 POKE-THROUGH ASSEMBLIES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hubbell Incorporated; Wiring Device-Kellems.
  - 2. Pass & Seymour/Legrand.
  - 3. Square D/Schneider Electric.
  - 4. Thomas & Betts Corporation.
  - 5. Wiremold/Legrand.
- C. Description:
  - 1. Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.
  - 2. Comply with UL 514 scrub water exclusion requirements.
  - 3. Service-Outlet Assembly:
    - a. Flushed type with two duplex receptacles and space for four RJ-45 jacks (4-inch cored holes)
    - b. Recessed type with four duplex receptacles and space for six RJ-45 jacks (8-inch cored holes) unless otherwise shown on the drawings, and complying with requirements of Division 27
  - 4. Size:

- a. Selected to fit nominal 4-inch and 8-inch cored holes in floor and matched to floor thickness.
- 5. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
- 6. Closure Plug: Arranged to close unused 6-inch and 8-inch cored openings and reestablish fire rating of floor.
- 7. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors and a minimum of two, four-pair cables that comply with requirements of Division 27

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
  - 1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
  - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
  - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
  - 4. Existing Conductors:
    - a. Cut back and pigtail, or replace all damaged conductors.
    - b. Straighten conductors that remain and remove corrosion and foreign matter.
    - c. Pigtail existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
  - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
  - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
  - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
  - 6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

### 3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.
2. Test Instruments: Use instruments that comply with UL 1436.
3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or

similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION 262726

## SECTION 262813

### FUSES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:

- 1. Cartridge fuses rated 600-V ac and less for use in control circuits enclosed switches.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material, dimensions, descriptions of individual components, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

- 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
  - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
  - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
- 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
- 3. Current-limitation curves for fuses with current-limiting characteristics.
- 4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.
- 5. Coordination charts and tables and related data.
- 6. Fuse sizes for elevator feeders and elevator disconnect switches.

- B. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in the general conditions and amendments thereto and include the following:

- 1. Ambient temperature adjustment information.
- 2. Current-limitation curves for fuses with current-limiting characteristics.
- 3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.
- 4. Coordination charts and tables and related data.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 with NYC Amendments, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70 with NYC Amendments.
- E. Comply with UL 248-11 for plug fuses.

#### 1.5 PROJECT CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

#### 1.6 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

#### 1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Cooper Bussmann, Inc.
  - 2. Edison Fuse, Inc.
  - 3. Ferraz Shawmut, Inc.
  - 4. Littelfuse, Inc.

#### 2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
  - 1. Service Entrance: Class L, time delay.
  - 2. Feeders: Class RK5, time delay.
  - 3. Motor Branch Circuits: Class RK5, time delay.
  - 4. Other Branch Circuits: Class RK5, time delay.

### 3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

### 3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

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## SECTION 262816

### ENCLOSED SWITCHES AND CIRCUIT BREAKERS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Fusible switches.
  - 2. Nonfusible switches.
  - 3. Receptacle switches.
  - 4. Shunt trip switches.
  - 5. Molded-case circuit breakers (MCCBs).
  - 6. Enclosures.

##### 1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

##### 1.5 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
  - 1. Enclosure types and details for types other than NEMA 250, Type 1.
  - 2. Current and voltage ratings.
  - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).

4. Include evidence of NRTL listing for series rating of installed devices.
  5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
  6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
1. Wiring Diagrams: For power, signal, and control wiring.
- C. Qualification Data: For qualified testing agency.
- D. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Field quality-control reports.
1. Test procedures used.
  2. Test results that comply with requirements.
  3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- F. Manufacturer's field service report.
- G. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in the general conditions and amendments thereto, include the following:
1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
  2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

## 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Comply with NFPA 70.

## 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
  - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
  - 2. Altitude: Not exceeding 6600 feet.
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by The City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
  - 1. Notify Commissioner no fewer than seven days in advance of proposed interruption of electric service.
  - 2. Indicate method of providing temporary electric service.
  - 3. Do not proceed with interruption of electric service without The City of New York's written permission.
  - 4. Comply with NFPA 70E.

## 1.8 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

## 1.9 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
  - 2. Fuse Pullers: Two for each size and type.

## PART 2 - PRODUCTS

### 2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  3. Siemens Energy & Automation, Inc.
  4. Square D; a brand of Schneider Electric.
- B. Type GD, General Duty, Single Throw, 240-V ac, 800 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with cartridge fuse interiors to accommodate indicated fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Type HD, Heavy Duty, Six Pole, Single Throw, 240-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Type HD, Heavy Duty, Double Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- F. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
  5. Hookstick Handle: Allows use of a hookstick to operate the handle.
  6. Lugs: Compression type, suitable for number, size, and conductor material.
  7. Service-Rated Switches: Labeled for use as service equipment.

## 2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  3. Siemens Energy & Automation, Inc.
  4. Square D; a brand of Schneider Electric.
- B. Type GD, General Duty, Single Throw, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

- D. Type HD, Heavy Duty, Six Pole, Single Throw, 240-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Type HD, Heavy Duty, Double Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- F. Accessories:
  - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  - 3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  - 4. Hookstick Handle: Allows use of a hookstick to operate the handle.
  - 5. Lugs: Compression type, suitable for number, size, and conductor material.

## 2.3 RECEPTACLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy-Duty, Single-Throw Fusible Switch: 240-V ac, 30 60 100 A; UL 98 and NEMA KS 1; horsepower rated, with clips or bolt pads to accommodate indicated fuses; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- C. Type HD, Heavy-Duty, Single-Throw Nonfusible Switch: 240-V ac, 30 60 100 A; UL 98 and NEMA KS 1; horsepower rated, lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- D. Interlocking Linkage: Provided between the receptacle and switch mechanism to prevent inserting or removing plug while switch is in the on position, inserting any plug other than specified, and turning switch on if an incorrect plug is inserted or correct plug has not been fully inserted into the receptacle.

## 2.4 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.

- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
  - 1. Instantaneous trip.
  - 2. Long- and short-time pickup levels.
  - 3. Long- and short-time time adjustments.
  - 4. Ground-fault pickup level, time delay, and  $I^2t$  response.
- F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
- H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- I. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- J. Features and Accessories:
  - 1. Standard frame sizes, trip ratings, and number of poles.
  - 2. Lugs: Compression type, suitable for number, size, trip ratings, and conductor material.
  - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
  - 4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
  - 5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
  - 6. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
  - 7. Alarm Switch: One NC contact that operates only when circuit breaker has tripped.

## 2.5 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
  - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
  - 2. Outdoor Locations: NEMA 250, Type 3R.

3. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in fusible devices.
- E. Comply with NECA 1.

#### 3.3 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
  1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  2. Label each enclosure with engraved metal or laminated-plastic nameplate.

#### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
  1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:
  - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
  - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
  - c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Overcurrent Protective Device Coordination Study".

END OF SECTION 262816

## SECTION 265000

### ARCHITECTURAL LIGHTING FIXTURE SPECIFICATIONS

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this section shall be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver, and install all work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.
- B. The work shall include but not be limited to the following:
  - 1. Complete shop fabrication
  - 2. Delivery to job site
  - 3. Installation at designated locations, and controls as noted
  - 4. Lamping and lamps
  - 5. Lamp focusing
  - 6. Cleaning and protection

##### 1.2 DESCRIPTION OF WORK

- A. Furnish and install a lighting fixture of the type indicated by letter at each location shown on the drawings.
- B. All materials, accessories, and any other equipment necessary for the complete and proper installation of all lighting fixtures included in this Contract shall be furnished by the Contractor.
- C. Conformance: Fixtures shall be manufactured in strict accordance with the Contract Drawings and Specifications.
- D. Codes: Materials and installation shall be in accordance with the latest revision of the National Electrical Code and any applicable Federal, State, and local codes and regulations.
- E. U.L. Listing: All fixtures shall be manufactured in strict accordance with the appropriate and current requirements of the Underwriters' Laboratories, Inc. "Standards for Safety," and others as they may be applicable. A UL listing shall be provided for each fixture type, and the appropriate label or labels shall be affixed to each fixture in a position concealing it from normal view.
- F. Specifications and scale drawings are intended to convey the salient features, function and character of the fixtures only, and do not undertake to illustrate or set forth every item or detail necessary for the work.

- G. Minor details, not usually indicated on the drawings nor specified, but that are necessary for the proper execution and completion of the fixtures, shall be included, the same as if they were herein specified or indicated on the drawings.
- H. Omissions: The City of New York shall not be held responsible for the omission or absence of any detail, construction feature, etc. which may be required in the production of the fixtures. The responsibility of accurately fabricating the fixtures to the fulfillment of this specification rests with the contractor.

### 1.3 REFERENCE STANDARDS

- A. ANSI/NFPA 70 – National Electrical Code
- B. New York City Electrical Code
- C. New York City Building Code (and Reference Standards)
- D. Underwriters Laboratory (UL)
- E. National Electrical Manufacturers Association (NEMA)
- F. Uniform Building Code, 1988 Edition for Seismic Design Requirements

Lighting fixtures: Section 47.1813 requires fixtures weighting less than 56 pounds to have two (2) number 12 hangers from the housing to the structure above; more than 56 pounds requires "approved" hanger pendant fixtures to be hung directly from the structure above.

- G. Aluminum Association (AA)
- H. American Iron and Steel Institute (AISI)

### 1.4 SUBMITTALS

- A. Shop Drawings shall clearly indicate the contract drawing number of fixture details used as reference in the development of the shop drawings, and the names of the job, and Commissioner.
- B. The Contractor shall coordinate all his lighting fixture drawings with the drawings and details of the Architectural, Structural, Electrical, Mechanical, and other related trades to assure a perfect and efficient installation.
- C. No variation from the general arrangement and details indicated on the drawing shall be made on the shop drawings unless required to suit the actual conditions on the premises, and then only with the written approval of the Commissioner.
- D. Catalogue cuts lacking sufficient detail to indicate compliance with contract documents will not be acceptable.
- E. Timely submission: Shop drawings for all lighting fixtures shall be received no later than sixty days after award of Contract.
- F. Review of shop drawings or samples does not waive contract requirements.

- G. Photometric Data: Where indicated on the fixture schedule and contract drawings, supply complete photometric data for the fixture including optical performance rendered by independent testing laboratory, developed according to methods of U.S.A. Illuminating Engineering Society. For down and semi-down lights used for general illumination:
1. Coefficients of utilization.
  2. Visual Comfort Probability data (fluorescent only for 100 foot-candles), rooms with reflectances of 80 percent (ceiling), 50 percent (walls), and 20 percent (floor), including a (20 ft. by 20 ft.) room with 10 ft. ceiling and luminaires lengthwise.
  3. Candlepower data, presented graphically and numerically, in 5 degree increments (5 degree, 10 degree, 15 degree, etc.). Data developed for up and down quadrants normal, parallel, and at 22-1/2°, 45°, 167-1/2° to lamps if light output is asymmetric.
  4. Zonal lumens stated numerically in 10 degree increments (5 degree, 15 degree, etc.) as above.
- H. For area and roadway luminaires isocandela charts, coefficients of utilization, and IES roadway distribution classification.
- I. Supply photometric data for any fixture offered in substitution for a specified fixture.

#### 1.5 SHOP DRAWINGS

- A. Submit shop drawings to the Commissioner for review in accordance with the requirements of the Contract Documents.
- B. Shop drawings shall include details and cuts of each fixture type scheduled herein, and shall include for each type the following information.
1. Type, lamping, size, material exterior and exterior, ballast type (where applicable), lenses, baffles, finishes, and means and methods of attachment.
  2. Include photometric data for each fixture.
  3. Submit thermal test data for ballasts regarding the tripping class P units based on the specified criteria (Reference 2.2 C).
- C. Submit reflected ceiling plans, sections and details so as to locate and define each fixture type and its location.
- D. Clearly indicate work to be provided by other trade subcontractors and coordinate accordingly.
- E. Indicate wiring and control circuits.
- F. To accommodate the seismic requirements, indicate supplementary spring type supports from the buildings structure for all fixtures 2 foot square in area and above.

## 1.6 SAMPLES

- A. After shop drawing approval, and prior to release for manufacturing, the Contractor shall furnish one sample of each fixture on the fixture schedule and contract drawings.
- B. Shipping: The samples shall be complete with specified lamp(s) ready for handling, energizing, and examining, and shall be shipped, prepaid by Contractor, to the Lighting Consultant, or as otherwise advised.
- C. Sufficient time shall be allowed for thorough examination of the samples by the Lighting Consultant.
- D. Samples are not returnable, nor included in quantities listed for a project.
- E. Samples must be actual working unit of materials to be supplied.

## 1.7 QUALITY ASSURANCES

### A. Qualifications

- 1. The Manufacturer shall be a specialty lighting firm who has been in the business of designing and manufacturing specialty lighting fixtures for not less than three (3) years.
- 2. The Installer, if not the manufacturer, shall be a firm having trained personnel who have been in the business of installing specialty lighting for not less than three (3) years and shall provide a full time field superintendent who shall be a representative of the installer during the installation and testing.

## 1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand new, and manufacturer's name. Delivered material shall be identical to the reviewed submittals.
- B. Store materials under cover in a dry and clean location, off the ground. Remove materials which are damaged, or otherwise not suitable for installation from the job site and replace with acceptable materials.
- C. The fixtures shall be delivered to the job site fully fabricated and assembled and ready for installation. Lamps shall be shipped separately.
- D. For luminaires incorporating Alzak cones or reflector/cones for protection pending completion of the installation: these components shall be supplied bulk packed in cartons separate from the luminaires. Unit packaging of cones or reflector/cones with luminaires is not acceptable.

## 1.9 WARRANTY

- A. Installation checkout: Upon completion of initial system installation and fixture cleaning, the trade subcontractor shall notify the Commissioner that the system has been completed. At this time, the subcontractor shall verify that the installation has

been done in full accordance with the design and specification and is in full and complete working order.

- B. The Trade Subcontractor and Manufacturer shall guarantee all lighting fixtures and major components, except lamps, for a period of two (2) years after acceptance of the project and final payment is made. The guarantee shall be in acceptable form and shall be signed and notarized by a person or persons authorized to execute such a document on behalf of the company.

## PART 2 PRODUCTS

### 2.1 LUMINAIRES

#### A. TYPE A1

1. Fixture – Optical Operation: Pendant mounted T8 direct/indirect distribution fluorescent luminaire with a high-efficiency white internal reflector.
2. Construction: The luminaire should have powder-coated white aluminum housing. The lens should be round and impact resistant polycarbonate with diffusion optics. The aircraft suspension kit should have white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate should be white powdercoated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture diameter of 3<sup>5</sup>/<sub>8</sub>" to 3<sup>7</sup>/<sub>8</sub>", and nominal fixture length to be 96".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Selux – Purelight Suspended PL9-1T8-SD-C-008-WH-120-DMA
  - b. Peerless
  - c. Neoray
  - d. Or approved equal.
6. Lamps: 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Electronic, high power factor, pre-wired, class "P" low profile ballast with type "A" sound rating with digital addressable dimming.
  - a. Lutron Ecosystem Digital Ballast for zoned smart dimming
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

B. TYPE A1-EM

1. Fixture – Optical Operation: Pendant mounted T8 direct/indirect distribution fluorescent luminaire with a high-efficiency white internal reflector.
2. Construction: The luminaire should have powder-coated white aluminum housing. The lens should be round and impact resistant polycarbonate with diffusion optics. The aircraft suspension kit should have white 1/16" cable mounting with a cable gripper for adjustment. The canopy cover plate should be white powdercoated, aluminum and round (Ø 5") to cover the junction box.
3. Voltage: 120 Volt
4. Nominal Dimensions: Nominal fixture diameter of 3 7/8" to 3 3/4", and nominal fixture length to be 96".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Selux – Purelight Suspended PL9-1T8-SD-C-008-WH-120-DMA-EM
  - b. Peerless
  - c. Neoray
  - d. Or approved equal.
6. Lamps: (2) 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Electronic, high power factor, pre-wired, class "P" low profile ballast with type "A" sound rating with digital addressable dimming and battery pack emergency ballast.
  - a. Lutron Ecosystem Digital Ballast for zoned smart dimming
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

C. TYPE B1

1. Fixture – Optical Operation: Pendant mounted E27 105W direct/indirect distribution fluorescent luminaire with a spherical polyethylene diffuser.
2. Construction: The luminaire should have a white spherical polyethylene diffuser, and the suspension kit should have cable mounting with a white canopy cover plate.
3. Voltage: 105 Volt

4. Nominal Dimensions: Ø 48" (120 cm) nominal diameter
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Slide Geoline In, Hanging Globo 120, E27 – 105W, LP SFH120, White
  - b. Or approved equal.
6. Lamps: E27 105W, Compact Fluorescent, 3000K
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed, remove all stickers and labels before installation.

D. TYPE B2

1. Fixture – Optical Operation: Pendant mounted E27 25W direct/indirect distribution fluorescent luminaire with a spherical polyethylene diffuser.
2. Construction: The luminaire should have a white spherical polyethylene diffuser, and the suspension kit should have cable mounting with a white canopy cover plate.
3. Voltage: 105 Volt
4. Nominal Dimensions: Ø 31.5" (80 cm) nominal diameter
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Slide Geoline In, Hanging Globo 80, E27 – 25W, LP SFH80, White
  - b. Or approved equal.
6. Lamps: E27 105W, Compact Fluorescent, 3000K
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed, remove all stickers and labels before installation.

E. TYPE C1

1. Fixture – Optical Operation: Ceiling mounted T8 direct distribution low profile fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 48", while fixture depth not to exceed 3" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting MIT8-1T-32-32W-120
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

F. TYPE C1-EM

1. Fixture – Optical Operation: Ceiling mounted T8 direct distribution low profile fluorescent emergency luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 48", while fixture depth not to exceed 3" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

- a. Bartco Lighting MIT8-1T-32-32W-120-EB
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
  7. Ballast: Standard Universal voltage electronic high power factor ballast with emergency battery backup, pre-wired to the lamp holders.
  8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
  9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

G. TYPE C2

1. Fixture – Optical Operation: Wall mounted T8 direct distribution low profile fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 48", while fixture depth not to exceed 3" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting MIT8-1T-32-32W-120
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.

9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

#### H. TYPE C2-EM

1. Fixture – Optical Operation: Wall mounted T8 direct distribution low profile fluorescent emergency luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 48", while fixture depth not to exceed 3" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting MIT8-1T-32-32W-120-EB
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Standard Universal voltage electronic high power factor ballast with emergency battery backup, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

#### I. TYPE C3

1. Fixture – Optical Operation: Pendant mounted T8 direct distribution low profile fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs. The suspension kit should have an aircraft cable suspension kit with a power feed. The canopy cover plate should match ceiling color with black cables.
3. Voltage: 120 volt

4. Nominal Dimensions: Nominal fixture length to be 48", while fixture depth not to exceed 3" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting MIT8-1T-32-32W-120
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

J. TYPE C3-EM

1. Fixture – Optical Operation: Pendant mounted T8 direct distribution low profile fluorescent emergency luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs. The suspension kit should have an aircraft cable suspension kit with a power feed. The canopy cover plate should match ceiling color with black cables.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 48", while fixture depth not to exceed 3" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting MIT8-1T-32-32W-120-EB
  - b. Legion
  - c. Prudential
  - d. Or approved equal.

6. Lamps: 32W T8 linear fluorescent lamp (48"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Standard Universal voltage electronic high power factor ballast with emergency battery backup, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

K. TYPE C4

1. Fixture – Optical Operation: Ceiling mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 50", while fixture depth not to exceed 2 $\frac{3}{8}$ " (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6100-50-120-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

L. TYPE C4-EM

1. Fixture – Optical Operation: Ceiling mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 50", while fixture depth not to exceed 2 $\frac{3}{8}$ " (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6100-50-120-EB-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30
  - b. Or approved equal.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders with emergency battery backup.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

M. TYPE C5

1. Fixture – Optical Operation: Wall mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 50", while fixture depth not to exceed 2 $\frac{3}{8}$ " (incl. lamp holders) and width not to exceed 2".

5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6100-50-120-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30
  - b. Or approved equal.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

N. TYPE C5-EM

1. Fixture – Optical Operation: Wall mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 50", while fixture depth not to exceed 2 $\frac{3}{8}$ " (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6100-50-120-EB-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30

b. Or approved equal.

7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders with emergency battery backup.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

O. TYPE C6

1. Fixture – Optical Operation: Pendant mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs. The suspension kit should have an aircraft cable suspension kit with a power feed. The canopy cover plate should match ceiling color with black cables.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 50", while fixture depth not to exceed 2<sup>3</sup>/<sub>8</sub>" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6300-50-120-SIN-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30
  - b. Or approved equal.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

P. TYPE C6-EM

1. Fixture – Optical Operation: Pendant mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs. The suspension kit should have an aircraft cable suspension kit with a power feed. The canopy cover plate should match ceiling color with black cables.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 50", while fixture depth not to exceed 2 $\frac{3}{8}$ " (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6300-50-120-EB-SIN-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30
  - b. Or approved equal.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders with emergency battery backup.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

Q. TYPE C7

1. Fixture – Optical Operation: Pendant mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs. The suspension kit should have an aircraft cable suspension kit with a power feed. The canopy cover plate should match ceiling color with black cables.
3. Voltage: 120 volt

4. Nominal Dimensions: Nominal fixture length to be 60", while fixture depth not to exceed 2<sup>3</sup>/<sub>8</sub>" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6300-60-120-SIN-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30
  - b. Or approved equal.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

R. TYPE C7-EM

1. Fixture – Optical Operation: Pendant mounted T6 direct distribution fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs. The suspension kit should have an aircraft cable suspension kit with a power feed. The canopy cover plate should match ceiling color with black cables.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 60", while fixture depth not to exceed 2<sup>3</sup>/<sub>8</sub>" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting BT6300-60-120-EB-SIN-FW
  - b. Legion
  - c. Prudential
  - d. Or approved equal.

6. Lamps: 38W T6 linear side-socket mounted fluorescent lamp (50"). Lamp color temperature to be 3000K, with a CRI of 88 and a rated life of 20,000 hours.
  - a. Bartco BFS650/30, Nippo FRT1250-EL30
  - b. Or approved equal.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders with emergency battery backup.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

S. TYPE D

1. Fixture – Optical Operation: Wall mounted T8 direct distribution low profile fluorescent luminaire.
2. Construction: Fully assembled 20-gauge steel housing chemically treated to resist corrosion, finished post production in high reflectance white powder coat. Housing is without side knock-outs.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture length to be 24", while fixture depth not to exceed 3" (incl. lamp holders) and width not to exceed 2".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Bartco Lighting MIT8-1T-17-17W-120
  - b. Legion
  - c. Prudential
  - d. Or approved equal.
6. Lamps: 17W T8 linear fluorescent lamp (24"). Lamp color temperature to be 3000K, with a CRI of 85 and a rated life of 24,000 hr. Lamp lumen rating to be 2850 Lm initial and 2710 Lm mean.
7. Ballast: Standard Universal voltage electronic high power factor ballast, pre-wired to the lamp holders.
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed. Remove all stickers and labels before installation.

T. TYPE W

1. Fixture – Optical Operation: Low profile steady burning blue incandescent fixture for security purposes.
2. Construction: Low profile surface mounted fixture with Type 4X gasket for dust- and water-tightness, featuring a polycarbonate dome, polyamide base, and built-in strain relief.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal fixture diameter to be 3", and nominal fixture height to be 2.5".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Federal Signal Corporation LP2-120B VAC-6W, #K8107195A-01
  - b. Edwards Signaling
  - c. Automation Systems Interconnect
6. Lamps: Bayonet Base 6W Incandescent Lamp with a rated life of 1,500 hours.
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

U. TYPE EX-1

1. Fixture – Optical Operation: NYC approved, wall mounted one-sided directional exit sign.
2. Construction: Die-cast aluminum housing and face plate, with a white, low-profile mounting canopy kit. Stencil to be white/silver finish, with 8" red letters for NYC approval. Battery and electronics to be contained within the housing for multi-mount function.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal height of the housing is 11", nominal width is 16¼", and nominal depth is 2¼". Total height with mounting kit is 12", and a total depth of 4½".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Atlite XLA2-8-D-R-1-WS

- b. McPhilben
- c. Lithonia
- d. Or approved equal.

- 6. Lamps: LED illumination strip.
- 7. Ballast: N/A
- 8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
- 9. Listing and Labeling: Fixture must be UL listed.

V. TYPE EX-2

- 1. Fixture – Optical Operation: NYC approved, wall mounted one-sided directional exit sign.
- 2. Construction: Die-cast aluminum housing and face plate, with a white, low-profile mounting canopy kit. Stencil to be white/silver finish, with 8" red letters for NYC approval. Battery and electronics to be contained within the housing for multi-mount function.
- 3. Voltage: 120 volt
- 4. Nominal Dimensions: Nominal height of the housing is 11", nominal width is 16¼", and nominal depth is 2¼". Total height with mounting kit is 12", and a total depth of 4½".
- 5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Atlite XLA2-8-D-R-1-WS
  - b. McPhilben
  - c. Lithonia
- 6. Lamps: LED illumination strip.
- 7. Ballast: N/A
- 8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
- 9. Listing and Labeling: Fixture must be UL listed.

W. TYPE EX-3

- 1. Fixture – Optical Operation: NYC approved, stem mounted one-sided directional exit sign.

2. Construction: Die-cast aluminum housing and face plate, with a white, low-profile 12" stem and mounting canopy kit. Stencil to be white/silver finish, with 8" red letters for NYC approval. Battery and electronics to be contained within the housing for multi-mount function.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal height of the housing is 11", nominal width is 16¼", and nominal depth is 2¼".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Atlite XLA2-8-D-R-1-WS, STW12
  - b. McPhilben
  - c. Lithonia
  - d. Or approved equal.
6. Lamps: LED illumination strip.
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

X. TYPE EX-4

1. Fixture – Optical Operation: NYC approved, inverse mounted one-sided directional exit sign.
2. Construction: Die-cast aluminum housing and face plate, with a white, low-profile mounting canopy kit. Stencil to be white/silver finish, with 8" red letters for NYC approval. Battery and electronics to be contained within the housing for multi-mount function.
3. Voltage: 120 volt
4. Nominal Dimensions: Nominal height of the housing is 11", nominal width is 16¼", and nominal depth is 2¼". Total height with mounting kit is 12", and a total depth of 4½".
5. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
  - a. Atlite XLA2-8-D-R-1-WS
  - b. McPhilben
  - c. Lithonia
  - d. Or approved equal.

6. Lamps: LED illumination strip.
7. Ballast: N/A
8. Samples: Samples may be required for submitted fixtures prior to approval unless manufacturer is noted above. Electrical contractor is responsible for providing any requested samples.
9. Listing and Labeling: Fixture must be UL listed.

## 2.2 FIXTURE CONSTRUCTION (GENERAL)

- A. All materials, accessories, and other related fixture parts shall be new and free from defects which in any manner may impair their character, appearance, strength, durability and function, and be effectively protected from any damage or injury from the time of fabrication to the time of delivery and until final acceptance of the work.
- B. Enclosures: Fabricate fixture enclosures with a minimum of #20 gauge (0.0359 inch) thick cold rolled sheet steel. Enclosures may be constructed of other metals, provided they are equivalent in mechanical strength and acceptable for the purpose. Fabricate lighting fixtures to be finished in vitreous porcelain enamel from a minimum of #20 gauge enameling steel.
- C. Sheet Metal Work: All sheet metal work shall be free from tool marks and dents, and shall have accurate angles bent as sharp as compatible with the gauges of the required metal. All intersections and joints shall be formed true of adequate strength and structural rigidity to prevent any distortion after assembly.
- D. Housings shall be so constructed that all electrical components are easily accessible and replaceable without removing fixtures from their mountings, or disassembly of adjacent construction.
- E. Castings: All castings shall be exact replicas of the approved patterns and shall be free of sand pits, blemishes, scales and rust, and shall be smoothly finished. Tolerance shall be provided for any shrinkage of the metal castings in order that the finished castings will accurately fit in their designated locations.
- F. All lamp sockets in lighting fixtures shall be suitable for the indicated lamps and shall be set so that lamps are positioned in optically correct relation to all lighting fixture components. If adjustable socket positions are provided, socket should be preset in factory for lamp specified. If different socket positions are specified for same fixture, sockets shall be preset for each type, and cartons marked accordingly.
- G. All fixtures shall be completely wired at the factory.
- H. Mounting Frames and Rings: If ceiling system requires, each recessed and semi-recessed fixture shall be furnished with a mounting frame or ring compatible with the ceiling in which they are to be installed. The frames and rings shall be one piece or constructed with electrically-welded butt joints, and of sufficient size and strength to sustain the weight of the fixture.

- I. Light leaks between ceiling trims of recessed lighting equipment and the ceilings will not be tolerated. If fixture is used in partially transparent ceiling, light leaks above the ceiling line will not be tolerated.
- J. Yokes, brackets and supplementary supporting members needed to mount lighting fixtures to carrier channels or other suitable ceiling members shall be furnished and installed by the Contractor.
- K. Outdoor Fixtures: Fixtures for use outdoors or in areas designated as damp locations shall be suitably gasketed to prevent the entrance of moisture. Provide approved wire mesh screens for ventilations openings.
- L. Hardware: For steel and aluminum fixtures, all screws, bolts, nuts and other fastenings and latching hardware shall be cadmium or equivalent plated. For stainless steel fixtures, all hardware shall be stainless steel. For bronze fixtures, all hardware shall be stainless steel or bronze.
- M. Temperature: All fixtures and ballasts must operate within the temperature limits of their design and as specified by Underwriters' Laboratories, Inc. in the applications and mounting conditions herein specified.
- N. Adjustable Angle Fixtures: Each lighting fixture which has a beam angle adjustment shall have reliable angle locking devices.
- O. Oval Beam Fixtures: Each lighting fixture which has a lamp with an oval shape beam pattern shall contain lamp orientation locking devices to ensure that beam orientation is not distributed during future lamp replacement or cleaning.

2.3 REFLECTORS & TRIMS

- A. Installation: Reflectors, reflector cones and visible trim of all lighting fixtures shall not be installed until completion of plastering, ceiling tile work, painting and general clean-up. They shall be carefully handled to avoid scratching or finger-printing and shall be, at the time of acceptance by the City of New York, completely clean.
- B. All Alzak parabolic cones shall be guaranteed against discoloration for a minimum of ten years, and, in the event of premature discoloration, shall be replaced by the Manufacturer, including materials and the cost of labor. Reflectors for fluorescent fixtures using triphosphor lamp technology shall not produce a visible "rainbow" of light.
- C. Aluminum reflectors shall be finished specular, semi-specular, or diffuse as required and shall meet or exceed Alzak specifications. Minimum requirements of reflector finishes for interior and exterior service shall be as follows:

Minimum weight of coating per description of service.	Minimum reflectance percent square inch.	Specular	Diffuse
Normal interior commercial	5.0	83.0	75.0

service			
General interior industrial and exterior work reflector protected by glass covering.	7.5	82.0	73.0
Exterior industrial and commercial reflector not protected.	10.0	78.0	75.0
Exterior marine service reflector not protected.	13.0	78.0	65.0

#### 2.4 LENSES

- A. Plastic for lenses and diffusers shall be formed of colorless 100% virgin acrylic as manufactured by Rohm & Haas, Dupont or as acceptable. The quality of the raw material must exceed IES, SPI, and NEMA Specifications by at least 100% which, as a minimum standard, shall not exceed a yellowness factor of 3 after 2,000 hours of exposure in the Fade-meter or as tested by an independent test laboratory. Acrylic plastic lenses and diffusers shall be properly cast, molded or extruded as specified, and shall remain free of any dimensional instability, discoloration, embrittlement, or loss of light transmittance for at least 15 years.
- B. Glass used for lenses, refractors, and diffusers in incandescent lighting fixtures shall be tempered for high impact and heat resistance. The glass shall be crystal clear in quality with a transmittance of not less than 88%. For exterior fixtures use tempered Borosilicate glass tempered Corning #7740 or as acceptable. For fixtures directly exposed to the elements and aimed above the horizontal with a radiant energy of 4.16 watts per square inch or greater, use Vycor glass.
- C. Where optical lenses are used, they shall be free from spherical and chromatic aberrations and other imperfections which may hinder the functional performance of the lenses.
- D. Mechanical: All lenses, louvers, or other light diffusing elements shall be removable, but positively held so that hinging or other normal motion will not cause them to drop out.
- E. Cleaning: All lenses shall be turned over to the City of New York clean and free of dust.

#### 2.5 LAMP HOLDERS

- A. Incandescent: Body: porcelain; Screw Shall: nickel-plated brass, prelubricated with silicone compound.
- B. Fluorescent: Body: white urea plastic; Contacts: silver-plated phosphor bronze.

## 2.6 FINISHES

- A. Painted Surfaces: Synthetic enamel, with acrylic, alkid, epoxy, polyester, or polyurethane base, light stabilized, baked on at 350° Fahrenheit minimum, catalytically or photochemically polymerized after application.
- B. White finishes: minimum of 85 percent reflectance.
- C. Ceiling opening frames shall either be manufactured of non-ferrous metal, or be suitably rustproofed after fabrication.
- D. Selection: Unless otherwise noted, finishes shall be as selected by the Commissioner.
- E. Undercoat: Except for stainless steel give ferrous metal surfaces a five stage phosphate treatment or other acceptable base bonding treatment before final painting and after fabrication.
- F. Unpainted non-reflecting surfaces shall be satin finished and coated with a baked-on clear lacquer to preserve the surface. Where aluminum surfaces are treated with an anodic process, the clear lacquer coating may be omitted.
- G. Unpainted Aluminum Surfaces: Finish interior aluminum trims with an anodized coating of not less than 7 mg. per square inch, of a color and surface finish as selected by the Commissioner. Finish exterior aluminum and aluminum trims with an anodized coating of not less than 35 mg. per square inch, of a color and surface finish as selected by the Commissioner.
- H. Porcelain Enamel Surfaces: Apply porcelain finishes smoothly. Finish shall be not less than 7.5 mils thick of non-yellowing, white, vitreous porcelain enamel with a reflectance of not less than 85%.

## 2.7 LAMPS

- A. Manufacturer: Lamps shall be manufactured by General Electric, Philips, or Osram/Sylvania. Unless otherwise noted, all lamps of a given fixture designation and lamp type shall be supplied by the same manufacturer.
- B. Provide lamps for all lighting fixtures (furnished as part of the electric work).
- C. Incandescent and tungsten halogen lamps shall not be operated, other than for initial testing, prior to final inspection, lighting control programming and/or turnover of finished space to the City of New York. If incandescent or tungsten halogen lamps are operated by the contractor during construction, all lamps must be replaced by the contractor prior to the turnover to the City of New York.
- D. Compact fluorescent, linear fluorescent, metal halide and LED lamps shall not be operated, during construction for a period of more than four (4) months prior to turn over of the finished space to the City of New York. If lamps are operated longer than four (4) months prior to turnover to the City of New York, all lamps must be replaced by the contractor.

## 2.8 FLUORESCENT LIGHTING FIXTURES

- A. General Construction and Materials: Housing end plates, socket bridges, reflectors, wiring channels and ballast covers shall be die formed of not less than #20 gauge (0.0359 inch thick) cold rolled steel unless specified otherwise.
- B. Lampholders shall be heavy white with definite locking-in feature and silver-plated contacts for proper lamp operation and life. Outdoor lampholders shall be neoprene gasketed and compression type. Sockets with open-circuit voltage over 300 volts: safety type and designed to open supply circuit on lamp removal.
- C. Mount lamps on rapid-start circuits within one inch of grounded metal, minimum one inch wide, as long as lamp.
- D. Construct fixtures so that ballast may be serviced or replaced without removal of fixture housing.

## 2.9 FLUORESCENT BALLASTS

- A. Standard Magnetic: Where called for in the Lighting Fixture Schedule, provide two lamp and/or single lamp standard magnetic ballasts in any one fluorescent fixture. Fluorescent lighting fixture magnetic ballasts (except single reactor type) shall be equipped with an internal, automatic resetting thermal protector adjacent to the coils, and on-time non-resetting thermal device to protect the capacitor. Ballasts shall be acceptable and listed by Underwriters' Laboratories Inc., as Class "P". Ballasts must have the manufacturer's best sound rating, and the sound rating indicated on the ballast. Ballasts shall be high power factor type, and shall be designed and constructed to maintain a case temperature not greater than 90°C when operated at a room ambient of 50°C when tested in accordance with UL and CBM standards. Ballasts shall be designated for single frequency operation 60 Hz. Nominal, and shall operate at the nominal voltages indicated on label, 120 volt and/or 277 volt as required.
- B. Electronic: Where called for in the Lighting Fixture Schedule, provide electronic ballasts for fluorescent light fixtures. Contractor is responsible for coordination of ballast compatibility with specified lamps. Electronic ballasts shall be acceptable and listed by Underwriters' Laboratories Inc., and Class "P" thermally protected. Ballasts shall have a power factor greater than 0.90, ballast factor equal to 0.93, total harmonic distortion less than 10%, and lamp current crest factor less than or equal to 1.6. Ballasts shall have a minimum starting temperature of 10° Celsius. Ballasts shall be free of Polychlorinated biphenyls (PCB's). Ballasts shall be designated for frequency of operation greater than 25 KHz nominal, and shall operate at the nominal voltages indicated on label, 120 volt and/or 277 volt as required.
  - 1. It shall be possible to operate ballasts for different length lamps on a single circuit.
  - 2. It shall be possible to operate multiple lamp ballasts on a single circuit with no perceptible difference in lamp light output.
  - 3. Fixture and ballast combination shall be inaudible in a 27 db room ambient.
  - 4. Ballast shall comply with all applicable state and federal efficiency standards.

5. Ballasts shall comply with FCC and NEMA limits governing electromagnetic and radio frequency interference and shall not interfere with operation of other normal electrical equipment.
6. Ballasts shall meet all applicable ANSI and IEEE standards regarding harmonic distortion and surge protection.
7. Ballasts shall not be affected by lamp failure and shall yield normal lamp life.
8. Ballasts shall operate at an input frequency of 60 Hz and an input voltage of 108 to 132 (120V models) or 249 to 305 (277V models).
9. Ballasts that operate as a parallel circuit shall allow remaining lamp(s) to maintain full output if companion lamp(s) fail.
10. Ballast manufacturers shall have been producing electronic ballasts in the U.S. for more than 10 years with a low failure rate.
11. Ballast shall carry three-year warranty, including labor allowance.

#### 2.10 INCANDESCENT AND HALOGEN LIGHTING FIXTURES

- A. General Construction and Materials: Incandescent lighting fixtures shall be listed and labeled by Underwriters' Laboratories, Inc., for installation in fireproof or non-fireproof construction, damp or wet locations, as required.
- B. Aluminum reflectors shall be Alzak (finish as selected) or as authorized, and not less than 0.057 inch thick unless specified otherwise.
- C. Lampholders shall be UL listed, and be heavy duty type constructed of high grade porcelain. Provide medium base sockets for lamps to and including 250 watts and mogul based sockets from 300 watts up to 1500 watts (rated for 1500 watts, 600 volt service) unless specified otherwise.
- D. Tungsten Halogen: Incandescent lighting fixtures utilizing tungsten halogen sources shall be designed and constructed so that lamp seal temperatures do not exceed 350°C at an ambient of 25°C when tested in accordance with UL Standard #57 and shall maintain an operating bulb wall temperature of approximately 600°C and not less than 250°C.
- E. Lead wires for fixtures utilizing tungsten halogen sources shall be rated for not less than 200°C operation, but shall be rated for 250°C if temperature warrants.
- F. Temperature on reflectors shall not exceed 205°C at any point.
- G. Junction Boxes: All fixtures supplied for recessing in suspended ceiling shall be supplied with prewired junction boxes.

#### 2.11 MANUFACTURERS

- A. Base bid for lighting fixtures of manufacturers listed.

- B. Alternate manufacturers: Identification by means of manufacturers' names and catalog numbers is to establish basic features and performance standards. Any substitutions must meet or exceed these standards.
  - 1. Where a product is specified to be by a designated manufacturer with "or equal by" an alternate manufacturer, the alternate manufacturer's product must meet the specifications given for the designated product. If the alternate manufacturer listed does not have a product that will meet the specification, then his product will not be acceptable.
  - 2. Where a product is specified to be by a designated manufacturer with "or equal by" an alternate manufacturer, the design, including space allocation, has been performed around the designated manufacturer. It is the contractor's responsibility to verify that the alternate manufacturer's equipment is complete with the same features, options, and photometric performance, as the designated manufacturer's equipment, and that it will fit in the available space (wall, plenum, cove, etc.).
- C. Qualifications: Within sixty days of placement of order, Contractor must furnish independent photometric tests and samples for all alternative fixtures. If fixture fails to comply with specification requirements at that time, Contractor will furnish acceptable fixture at no additional cost to the City of New York, and with no delay to the product.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Installation: Do not scale electrical drawings for exact location of the lighting fixtures. In general, the architectural reflected ceiling plans indicate the proper locations of lighting fixtures.
- B. Appurtenances: Install each fixture properly and safely. Furnish and erect hangers, rods, mounting brackets, supports, frames, and other equipment requirement.
- C. Coordination: Furnish lighting fixtures complete with appurtenances required for the proper, safe and distortion-free installation in the various surfaces in which they appear. Determine surface types from the Architectural drawings.
- D. Instructions: Each lighting fixture shall be packaged with complete instructions and illustrations showing how to install. Install lighting fixtures in strict conformance with manufacturer's recommendations and instructions.
- E. Rigidly align continuous rows of lighting fixtures for true in-line appearance.
- F. Pendant Fixtures: Install pendant lighting fixtures plumb and at a height from the floor as specified on the drawings. In cases where conditions make this impractical, refer to the Commissioner for a decision. Use ball aligners and canopies on pendant fixtures unless noted otherwise.
- G. Do not install fixtures and/or parts such as finishing plates and trims for recessed fixtures until all plastering and painting that may mar fixtures' finish has been completed.

- H. Mechanical Rooms: Lighting fixture locations in mechanical and electrical equipment rooms are approximate. Coordinate mounting height and location of lighting fixtures to clear mechanical, electrical and plumbing equipment and to illuminate adequately meters, gauges and equipment.
- I. Support all lighting fixtures independently of duct work or piping.
- J. Concealment: Whenever a fixture or its hanger canopy is applied to a surface mounted outlet box, a finishing ring shall be utilized to conceal the outlet box.
- K. Splices in internal wiring shall be made with approved insulated "wire nut" type mechanical connectors, suitable for the temperature and voltage conditions to which they are subjected.
- L. All wire utilized for connections to or between individual lamp sockets and lamp auxiliaries (i.e., wires which do not constitute "through circuit" wiring) shall be suitable for temperature, current, and voltage conditions to which it is subjected.
- M. Install reflector cones, baffles, aperture plates, light controlling element for air handling fixtures, and decorative elements after completion of ceiling tiles, painting and general cleanup.
- N. Replace blemished damaged or unsatisfactory fixtures as directed.

### 3.2 AIMING AND ADJUSTMENT

- A. All adjustable lighting units shall be aimed, focused, locked, etc., by the Subcontractor under the supervision of the Lighting Consultant. The Lighting Consultant shall indicate the number of crews (foreman and apprentice) required. All aiming and adjusting shall be carried out after the entire installation is complete. All ladders, scaffolds, etc. required shall be furnished by the Contractor at the direction of the Lighting Consultant. As aiming and adjusting is completed, locking set-screws and bolts and nuts shall be tightened securely.
- B. Night Work: Where possible, unit shall be focused during the normal working day. However, where daylight interferes with seeing, aiming shall be accomplished at night.

### 3.3 CLEANUP

- A. At the time of final acceptance by the City of New York, all lighting fixtures shall have been thoroughly cleaned with materials and methods recommended by the manufacturers, all broken parts shall have been recommended by the manufacturers, all broken parts shall have been replaced, and all lamps shall be operative.

### 3.4 MAINTENANCE

- A. The Contractor shall be responsible for obtaining from his supplying lighting manufacturers, for each type of lighting fixture, a recommended maintenance manual including:
  1. Tools required.
  2. Types of cleaners to be used.

3. Replacement parts identification lists.
  4. Final, as-built shop drawings.
- B. Six (6) bound copies of this material shall be forwarded to the City of New York.
  - C. The Contractor shall be responsible for ordering an additional 10% of the specified lamps for City of New York's stock.

### 3.5 WARRANTY

- A. The Contractor shall warrant the fixture, its finishes, and all of its component parts, except ballasts, to be free from defects for a period of two years from date of acceptance if operated within rated voltage range. Replacement of faulty materials and the cost of labor required to make the replacement shall be the responsibility of the Contractor. Ballasts shall be warranted for the two years.

END OF SECTION

## SECTION 270526

### COMMUNICATIONS GROUNDING AND BONDING

#### PART 1 – GENERAL

##### 1.01 CONTRACT DOCUMENTS

- A. The requirements and recommendations of these Communications Grounding and Bonding Specifications, together with the Communications Drawings (Drawing Series TE-001, TE-101, TE-102, TE-103, TE-104, TE-401, TE-501, TE-502, TE-503 and TE-701) shall be considered part of these Contract Documents.
- B. The general provisions of the Contract, including Division 01 General Conditions and the Addendum to the General Conditions, together with the following articles of the Communications Grounding and Bonding Specifications, which amend, modify and supplement various articles and provisions of the General Conditions and the Addendum to the General Conditions, are made part of the Contract.
- C. All articles or parts of Division 01 General Conditions and the Addendum to the General Conditions not so amended, modified or supplemented by these Communications Grounding and Bonding Specifications shall remain in full force and effect. Should any discrepancy become apparent between the General Conditions and these Specifications, the Contractor shall notify the Commissioner, in writing, and the Commissioner shall interpret and decide such matters in accordance with the provisions of the General Conditions.
- D. The requirements and recommendations of all Codes, Regulations and Standards referred to in Paragraph 1.07 and throughout this Specifications document, shall be considered part of these Contract documents.
- E. It is the intent of these Specifications to provide a complete workable communications grounding and bonding system ready for use by the City of New York. Any item not specifically shown on the drawings or called for in the Specifications, but normally required to conform to the intent, is to be considered part of the Contract.
- F. This Specifications document is equipment and performance Specifications. Actual installation shall be as indicated on the Drawings. Any discrepancies found between the Specifications and Drawings shall be brought to the attention of the Commissioner. Installation and details indicated on the Drawings shall govern if they differ from the Specifications.
- G. Certain terms such as “shall, provide, install, complete, etc.”, are not used in some parts of this Specifications document. This does not indicate that the items shall be less than completely installed or that the system shall be less than complete.

##### 1.02 RELATED DOCUMENTS

- A. Division 271000 Communications Cabling Specifications.
- B. Division 270528 Communications Pathways Specifications.

C. Division 26 Electrical Specifications.

#### 1.03 CONTRACTOR QUALIFICATIONS

- A. The work shall be carried out by a specialist installer company.
- B. The selected Contractor shall have a proven track record in the field of Telephone, Data (Category 3, 5E and 6 and optical fiber), Video (coaxial) and Communications Grounding and Bonding Systems installation. Personnel shall be competent and qualified by experience and training for installation and testing of communications cabling plants and grounding and bonding systems.

#### 1.04 QUANTITIES

- A. Unless otherwise indicated in this document or on the contract drawings, the quantities shall be based on the quantities shown on the contract drawings.

#### 1.05 ABBREVIATIONS

- A. The following abbreviations are used on the Drawings and within the Specifications:

1. ANSI: American National Standards Institute
2. ASTM: American Society of Testing Materials
3. AWG: American Wire Gage
4. CM: NEC cable rating: Communications Cable rated for general purpose use.
5. CMP: NEC cable rating: Communications Cable rated for use in plenum areas.
6. CMR: NEC cable rating: Communications Cable rated for use in riser areas.
7. dB: Decibel.
8. DTMF: Dual Tone Multi-Frequency.
9. EIA: Electronic Industries Association.
10. FCC: Federal Communications Commission.
11. ft: Feet.
12. IEEE: Institute of Electrical and Electronics Engineers.
13. in. Inch.

- |     |                  |   |
|-----|------------------|---|
| 14. | lb.              | Pound.  |
| 15. | LAN:             | Local Area Network.   |
| 16. | Mbps:            | Megabits per second.  |
| 17. | MHz:             | Mega Hertz.   |
| 18. | NEC:             | National Electrical Code.                                     |
| 19. | NFPA:            | National Fire Protection Association.                         |
| 20. | OFNP:<br>rating. | NEC Cable Rating: Optical Fiber Non-conductive Plenum rating. |
| 21. | OFNR:            | NEC Cable Rating: Optical Fiber Non-conductive Riser rating.  |
| 22. | OSHA:            | Occupational Safety and Health Act.                           |
| 23. | OTDR:            | Optical Time Domain Reflectometer.                            |
| 24. | PBX:             | Private Branch Exchange.                                      |
| 25. | pF:              | Pico Farad ( $10^{-12}$ Farad).                               |
| 26. | PVC:             | Polyvinyl Chloride.   |
| 27. | RMS:             | Rack Mount Space.   |
| 28. | RU:              | Rack Unit (same as RMS) = 1.75 inch.                          |
| 29. | TER              | Technology Equipment Room.                                    |
| 30. | TSER             | Technology Service Entrance Room.                             |
| 31. | TIA:             | Telecommunications Industries Association.                    |
| 32. | UTP:             | Unshielded Twisted Pair.                                      |
| 33. | UL:              | Underwriters' Laboratories, Inc.                              |

#### 1.06 DEFINITIONS

A. The following definitions apply to the Drawings and Specifications:

1. "ABANDONED COMMUNICATIONS CABLE" Existing Voice, Data or Video Communications Cable that is not terminated at both ends at a connector or other equipment and not identified for future use with a tag (NEC, Article 800-2).
2. "APPROVED" means as accepted and authorized, in writing, by the Commissioner.

3. "AS DIRECTED" means as directed by the Commissioner.
4. "CONCEALED" means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings.
5. "CONDUIT" or "CABLE TRAY" or "LADDER RACK" or "RUNWAY" or "CABLE RACEWAY" means the inclusion of all fittings, hangers, supports, sleeves, etc.
6. "EXPOSED" means not installed underground or "CONCEALED" as defined above.
7. "INSTALL" means to move from property line, set in place, join, unite, fasten, link, attach, set up, or otherwise connect together before testing and turning over to the City of New York the particular work and materials referred to. Installation is to be completed and ready for regular operation for the particular work referred to.
8. "PROVIDE" or "FURNISH" means to supply, transport, place, erect, connect, test and turn over to the City of New York, complete and ready for regular operation, the particular work and materials referred to.
9. "SUPPLY" means to purchase, procure, acquire, and deliver complete with related accessories.
10. "WIRING" or "CABLING" means the inclusion of all fittings, conductors, connectors, connections, terminations, and all other necessary and/or required components in connection with such work.

#### 1.07 CODES, REGULATIONS AND STANDARDS

- A. Comply with the most recently issued requirements, standards, recommendations, rules, and regulations of:
  1. National Fire Protection Association (NFPA)
    - a. NFPA 70 - National Electrical Code (NEC)
    - b. NFPA 101
    - c. NFPA 80
  2. Federal Communications Commission (FCC), Title 47:
    - a. Part 15.
    - b. Part 68.
  3. Federal, State, County, City Electrical Codes, Ordinances and Regulations.

4. Occupational Safety and Health Administration (OSHA).
  5. Americans with Disabilities Act (ADA).
  6. National Electrical Manufacturers' Association (NEMA).
  7. Underwriters Laboratories, Inc.:
    - a. UL Listed.
    - b. UL Approved.
  8. Institute of Electrical and Electronic Engineers (IEEE):
    - a. IEEE 802.3.
    - b. IEEE 802.11 (a, b, g, n).
  9. ANSI/TIA/EIA-568C – Commercial Building Telecommunications Cabling Standard.
  10. ANSI/TIA/EIA-569C – Commercial Building Standard for Telecommunications Pathways and Spaces.
  11. ANSI/TIA/EIA-606B – Administration Standard for Commercial Telecommunications Infrastructure.
  12. ANSI/J-STD-607-A – Commercial Building Grounding and Bonding Requirements for Telecommunications.
  13. BICSI - Building Industry Consulting Services International.
  14. Manufacturers' recommendations.
- B. Local Electrical and Building Codes may differ from national codes. Follow the most stringent codes or recommendations. Where there are ambiguities, refer to the Commissioner for interpretation.
- C. All equipment shall be equal to or exceed the minimum requirements of NEC, IEEE, ASME, ANSI, and UL.

#### 1.08 SYSTEM DESCRIPTION

- A. Woodstock Library is located at 761 East 160<sup>th</sup> Street, Bronx, NY 10456 and it is part of the New York Public Library system.
- B. Woodstock Library occupies a landmark building consisting of three floors and a cellar.
- C. The Library's Technology Service Entrance Room (TSER) and Technology Equipment Room (TER) are located in the cellar of the building.

- D. The Technology Equipment Room supports the communications needs of the entire building with no additional technology closets required on upper floors.
- E. The Library's Security Equipment Room is located adjacent to the Technology Equipment Room. The two rooms are separated by a chain-link fence.
- F. The Technology Equipment Room shall be equipped with a Telecommunications Main Grounding Busbar (TMGB). The Telecommunications Main Grounding Busbar shall be connected to the building main ground electrode via a backbone bonding conductor.
- G. The Technology Service Entrance Room shall be equipped with a Telecommunications Grounding Busbar (TGB), which shall connect to the TMGB via a backbone bonding conductor.
- H. Because of proximity, the Security Equipment Room may utilize the TMGB.

#### 1.09 SCOPE OF WORK

- A. The work covered by this Specification document includes the construction described, all labor necessary to perform and complete such construction; all materials and equipment incorporated or to be incorporated in such construction; and all services, facilities, tools and equipment necessary or used to perform and complete such construction.
- B. Provide and install a Telecommunication Main Grounding Busbar (TMGB) in the Technology Equipment Room, as shown on the drawings.
- C. Provide and install the telecommunications backbone bonding conductor (TBB) between the TMGB and the Main Electrical/Switchgear Room located in the Cellar of the same building, as shown on the drawings.
- D. Provide and install a Telecommunication Grounding Busbar (TGB) in the Technology Service Entrance Room, as shown on the drawings.
- E. Provide and install the telecommunications backbone bonding conductor (TBB) between the TGB and the TMGB located in the Technology Equipment Room.
- F. Provide and install all cable supports (tie wraps, etc.) including mounting and installation hardware, within ceiling, except for the conduit, j-hooks and cable tray provided under the Communications Pathways Specifications.
- G. Provide and install all non-specified miscellaneous hardware, including, but not limited to nuts, bolts, re-enterable cable ties, spiral wrap, wire rings, supporting hardware and similar components required for a complete cabling system installation.
- H. Provide and install labeling and documentation of all cables and hardware installed under this contract.
- I. Provide and install fire-stopping for all penetrations and openings through fire rated walls and floors after installation of the telecommunications grounding and bonding system.
- J. Provide system testing and testing documentation as described below.

1.10 RELATED WORK NOT INCLUDED

- A. Cutting, patching and painting.

1.11 SUBMITTALS

- A. Submit manufacturers' product data sheets for all material and equipment products proposed in bid. Only specified or accepted manufacturers or suppliers shall appear in the product data submittal. Provide physical samples of products if so directed by the Commissioner.
- B. Where substitutions or alternates are requested for any specified manufacturer or product, submit complete documentation for the product proposed, including complete product data and catalog cut sheets, engineering test and performance reports and any other information pertinent to the product. Orders of materials not specified or pre-approved by the Commissioner shall be at the Contractor's risk. No reshipping or restocking charges shall be accepted by the City of New York.
- C. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location and date of original installation. Add pre-testing record of each piece of equipment listing name of person testing, date of test, set points of adjustments, name and description of the view of the preset position.
- D. Submit shop drawings for approval ten (10) days prior to start of work and prior to the ordering of material including:
  - 1. Detailed assemblies of standard components that are custom assembled for specific application on this project.
  - 2. Functional block diagrams to show single-line interconnections between components for grounding. Show cable types and sizes.
  - 3. Dimensioned plan and wall elevations of bus-bars, etc. Show access and work space requirements.
- E. Shop drawings shall consist of one (1) set of reproducible and three (3) sets of prints of drawings indicating device locations, device labels, wall elevations, wiring diagrams to include devices connectivity, riser diagrams and manufacturers' data in accordance with the contract documents. All documentation must be keyed for cross-referencing. Shop drawings must include complete bill of materials. Failure to provide complete documentation as described above shall be cause for rejection.

1.12 SYSTEM SIGN-OFF SUBMITTALS

- A. As-built drawings:
  - 1. At the completion of installation, furnish a complete set of as-built documents, including plan view and elevation drawings and cable pull schedules.

2. As-built drawings shall consist of one (1) set of reproducible and three (3) sets of prints. Cable pull schedules shall be provided in one (1) hard copy and one (1) computer CD format.
- B. Field quality-control test reports.
- C. Warranty documentation as described in paragraph 1.19.

#### 1.13 JOB CONDITIONS

A. Inspection of Site Conditions:

1. Before starting work, visit the site and examine the conditions under which the work has to be performed. Report in writing any conditions which might adversely affect the work.

B. Connections to existing systems:

1. Install new work and connect to existing work with minimum interference to existing facilities.
2. Do not interrupt active cables or networks unless specifically directed. Provide temporary shutdowns of existing services at no additional charges and only with written consent of the Commissioner. Scheduled shutdowns shall not interfere with the normal operation of existing facilities.
3. Connect new work to existing work in a neat and acceptable manner. Restore the existing disturbed work to its original condition including maintenance of wiring continuity required.

C. Removal and relocation of existing work:

1. Disconnect, remove or relocate telecommunications cable, materials, equipment, and other work noted and required by alterations, modifications, or changes in existing construction.
2. Identify and completely remove all existing telecommunications cabling that is not specifically designated to be re-used. Do not abandon, cut back or leave cable in cable pathways or conduits. Dispose of it as directed by the Commissioner.

#### 1.14 COORDINATION OF THE WORK

- A. Coordinate project and schedule work with the general contractor in accordance with the schedule and construction sequence.
- B. Wherever work interconnects with work of other trades, provide the information necessary to properly install all the connections and equipment. Identify all items of work that require access so that the ceiling and/or floor trade will know where to install access doors and panels, and where to leave ceiling/floor spaces accessible for wiring installation.

- C. Attend all construction meetings as requested by the Commissioner.
- D. Maintain a complete file of shop drawings available at all times to the Commissioner.
- E. Prior to actual installation, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper compliance with the design intent.

#### 1.15 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Delivery of Materials: The contractor shall be responsible for the receipt, delivery and safe storage of materials and equipment to the job site. Deliver materials (except bulk materials) in manufacturers' unopened containers.
- B. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.
- C. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and weather until installation. Replace equipment damaged in the course of handling without additional charge.
- D. Arrange for and provide storage space or area at the job site for materials and equipment to be received and/or installed in this project.

#### 1.16 PROTECTION OF MATERIALS

- A. Protect from damage, water, dust, etc. materials, equipment and apparatus provided under this trade, both in storage and installed.

#### 1.17 QUALITY ASSURANCE

- A. The contractor or subcontractor performing the work of this section must, within the last three (3) consecutive years prior to the bid opening, have successfully completed in a timely fashion projects similar in scope and type to the required work.
- B. Furnish materials and equipment new, free from defects and with listings or labels as defined in NFPA 70, Article 100, by a testing agency (Underwriter's Laboratories, Inc., etc.) acceptable to authorities having jurisdiction and marked for intended use.
- C. All materials and equipment provided and installed under the contract shall comply with NECA 1 and NFPA 70.
- D. All items of a given type shall be the product of the same manufacturer.
- E. All materials and equipment shall be the product of manufacturers regularly engaged in their manufacture.

#### 1.18 ACCESSIBILITY

- A. Install work so that parts requiring periodic inspection, operation, maintenance and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.

#### 1.19 WARRANTY

- A. Warranty all portions of the work against faulty and improper material for a minimum period of twenty (20) years from the date of final acceptance by the City of New York. Warranty all portions of the work against workmanship for a minimum period of one (1) year from the date of final acceptance by the City of New York. Where warranty for a longer term is offered through a manufacturer/installer certification program, such longer term shall apply.
- B. Repair or replacement service during warranty period shall be performed 24 hours a day, seven days a week, with a four-hour response time.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Any given item of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item shall not be permitted, unless specifically noted otherwise or approved by the Commissioner.
- B. Substitutions or alternates for the manufacturers listed will not be permitted without the written consent of the Commissioner. Refer to Section 1.11 – Submittals, for further information.

#### 2.02 APPROVED MANUFACTURERS

- A. Grounding Bus-bars:
  - 1. Chatsworth Products Inc. (CPI)  
31425 Agoura Road  
Westlake Village, CA 91361  
Tel: (800) 834-4969  
[www.chatsworth.com](http://www.chatsworth.com)
  - 2. Cooper B-Line  
509 W. Monroe Street  
Highland, IL 62249  
Tel: (618) 654 2184  
[www.b-line.com](http://www.b-line.com)
  - 3. Erico  
30575 Bainbridge Road, Suite 300  
Solon, OH 44139  
Tel: 440 349 2630  
[www.erico.com](http://www.erico.com)
  - 4. Hubbell Premise Wiring

14 Lord's Hill Road  
Stonington, CT, 06378  
Tel: (800) 626 0005  
[www.hubbell.com](http://www.hubbell.com)

5. Burndy LLC - USA  
47 E Industrial Park Drive  
Manchester NH 03109  
Tel: (800) 346 4175  
[www.burndy.com](http://www.burndy.com)
6. Framatome Connectors, LLC (FCI USA, LLC)  
825 Old Trail Road  
Etters, PA 17319  
Tel: (800) 237 2374  
[www.fci.com](http://www.fci.com)

## 2.03 GROUNDING BUSBARS

### A. Telecommunications Main Grounding Busbar (TMGB)

1. Provide and install pre-drilled, solid copper telecommunications main grounding busbar (TMGB) complete with insulated stand-off brackets, head bolts, lock washers, etc.
2. Use:
  - a. In the Technology Equipment Room located in the Cellar.
3. TMGB Size: 12" L x 4" W x 1/4" D.
4. The equipment shall be UL listed.
5. The equipment shall be NEC compliant.
6. The equipment shall be BICSI and ANSI/J-STD-607-A compliant.
7. Quantity:
  - a. Provide and install (1) telecommunications main ground busbar in the Technology Equipment Room as shown on the drawings.
8. Manufacturer: Chatsworth Products Inc.  
TMGB Part Number: 40153-012 (includes insulators, stand-off brackets, assembly stainless steel bolts, lock washers, flat washers).  
  
Or approved equivalent.

### B. Telecommunications Grounding Busbar (TGB)

1. Provide and install pre-drilled, solid copper telecommunications grounding busbar (TGB) complete with insulated stand-off brackets, head bolts, lock washers, etc.
2. Use:
  - a. In the Technology Service Entrance Room located in the Cellar.
3. TGB Size: 10" L x 2" W x 1/4" D.
4. The equipment shall be UL listed.
5. The equipment shall be NEC compliant.
6. The equipment shall be BICSI and ANSI/J-STD-607-A compliant.
7. Quantity:
  - a. Provide and install (1) telecommunications ground busbar in the Technology Service Entrance Room as shown on the drawings.
8. Manufacturer: Chatsworth Products Inc.  
 TGB Part Number: 13622-010 (includes insulators, stand-off brackets, assembly stainless steel bolts, lock washers, flat washers).  
 Or approved equivalent

## 2.04 CONDUCTORS AND CABLES

### A. Bonding Conductors

1. Provide and install PVC insulated (green), solid copper grounding conductors. Sized as noted herein and on the drawings. UL listed and Local Electrical Code approved for application.
2. Secure connections to the TMGB and TGB using two-hole compression connectors.
3. Provide equipment complete with copper ground clamps, copper ground stud, etc.
4. Aluminum conductors or components shall not be used in the grounding system or any of its subsystems. The only exception permitted is aluminum fittings for aluminum cable tray and ladder rack. However, in this case, all associated conductors must be copper as described herein.
5. Quantity as necessary.
6. Manufacturer: Burndy  
 Part Number:

TBB length in linear m (ft)	TBB Size (AWG)	Part Number
Less than 4 m (13 ft.)	6 AWG	YA8CL-2TC38
4-6 m (14-20 ft)	4 AWG	YA4CL-2TC38
6 - 8 m (21-26 ft)	3 AWG	YA3CL-2TC38
8-10 m (27-33 ft)	2 AWG	YA2CL-2TC38
10-13 m (34 - 41 ft)	1 AWG	
13-16 m (42 - 52 ft)	1/0 AWG	YA25L-2TC38
16 - 20 (53 - 66 ft)	2/0 AWG	
Greater than 20 m (66 ft.)	3/0 AWG	YA27L-2TC38

Or approved equivalent.

### PART 3 – EXECUTION

#### 3.01 GENERAL

- A. Follow manufacturers' instructions for installing the communications grounding system. Where instructions are unavailable, follow approved industry practice.
- B. Examine and compare the communications drawings and specifications with the drawings and specifications of other trades, report any discrepancies to the Commissioner, and obtain written instructions for changes necessary in the work. Include most stringent requirements in the bid.
- C. Repairs or changes caused by the Contractor's neglect shall be made at the contractor's expense. Protect the finished work of other trades from damage or defacement and remedy any damages as required.
- D. Install and coordinate the communications grounding work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interferences in a manner accepted by the Commissioner.
- E. The locations of busbar, conduits, and other equipment indicated on the drawings are approximately correct and are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed.
- F. Maintain a minimum of 12" separation between communications grounding running parallel to electrical cables or conduits. When crossing, maintain a 3" minimum separation and cross only at 90°. Maintain minimum 12" separation from fluorescent light fixtures.
- G. Keep items protected before and after installation, with dust and moisture proof barrier materials. Maintain the integrity of these protective measures until installation is complete and accepted by the City of New York.
- H. Clean up debris generated by installation activities and discard of as directed by the Commissioner.

#### 3.02 GROUNDING SYSTEM INSTALLATION

- A. Grounding system shall be installed in accordance with the requirements of the local authorities, and subject to the approval of the Commissioner.
- B. Ground wires and bonding jumpers shall be green insulated, copper. Ground wires shall be without joints and splices over the entire length.
- C. Ground wires run in mechanical equipment rooms, concealed areas or in the ceiling plenum shall be in non-ferrous conduit.
- D. Where it is necessary to place bonding conductors in ferrous metal conduit that exceeds 3' in length, the conductors shall be bonded to each end of the conduit. Obtain written authorization from the Commissioner prior to utilizing ferrous metal conduits for grounding conductors.
- E. Install bonding and grounding conductors in direct, straight paths with no "slack" copper loops or extra lengths. Bends shall be kept to a minimum, and shall have a radius of 4", minimum.
- F. Provide an insulated, uninterrupted Telecommunications Bonding Backbone (TBB) conductor between the TMGB and TGB, and between TMGB and the Main Electrical Room as indicated on the drawings. Mechanically bond the TBB to the TMGB and TGB with a two-hole lug that is hydraulically crimped onto the end of the TBB. Remove only as much insulation from the TBB as is necessary and practical to complete the bond.
- G. Provide an insulated, uninterrupted grounding conductor from TMGB to the building steel, if accessible. The bonding conductor shall be exothermically welded to the building steel and mechanically bonded to the TMGB with a two-hole lug that is hydraulically crimped onto the conductor.

### 3.03 SYSTEM TESTING

- A. Test all cables installed under the contract.
- B. Pre-installation Inspection:
  - 1. Visually inspect all cables, cable reels and shipping cartons for shipping damage. Return visibly damaged items to the manufacturer.
  - 2. Prior to testing, submit for review and approval copies of test report forms proposed for use. Forms shall, at minimum, contain: Project Name; Contractor's Name; Date of Test; Media Type and Description; Make, Model and Serial Number of the test equipment and date of last calibration.
- C. Post-Installation Testing:
  - 1. Test only completed systems. Partial or statistically sampled testing is not acceptable, except by prior, written approval from the Commissioner.
- D. Bonding Methods:

1. Mechanical and exothermal bonds shall be rigid and physically secure.
2. There shall be no evidence of paint, contamination or lack of continuity between metallic members.
3. The bond shall be supported to prevent loosening of the bond over time, and it shall be protected from damage.
4. Bonds shall have an electrical resistance of less than 0.5 ohms.

### 3.04 SYSTEM LABELLING

- A. User color coding in accordance with EIA-606B standards.
- B. Grounding cables shall be labeled with (at minimum) machine generated black uppercase lettering on a permanent adhesive label stock, covered with a permanent water resistant sealer. Contractor shall use labeling stock and/or lettering that provides a high contrast with the color of the terminating equipment, faceplate or cable.
- C. Labels shall be attached to each end of each conductor as close as practical to the point of termination.
- D. Provide non-metallic, permanent, machine generated cable tags. Temporary tags are acceptable only during construction. Label each tag with the appropriate cable number as determined in the cable pull schedules.
- E. Cable identification numbers shown in the cable pull schedules shall be presented in an abbreviated format. Cables ID's shall (at minimum) indicate the floor, originating cost ID, and the sequential cable number.
- F. If at any time during the job the permanent cable tag becomes illegible or is defaced or removed, immediately replace it with a duplicate pre-printed cable tag.
- G. Labels for grounding conductors shall say: "WARNING IF THIS CONDUCTOR OR CABLE IS LOOSE OR MUST BE REMOVED PLEASE CONTACT THE FACILITY TELECOMMUNICATIONS MANAGER".

### 3.05 FIRE STOPPING

- A. When passing through partitions of floors, provide fire-stopping in the following manner: place fire-stop material at each end and around each conduit.
- B. Seal penetrations through fire rated walls, floors and walls created by or made on behalf of the contractor so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the National Electric Code.
- C. Use sealant material that has passed fire exposure testing in accordance with standard time-temperature curve in the standard UL ASTM E 119 and NFPA 251 and the hose stream test in accordance with UL 10B.

- D. Provide removable fire-stopping pillows in an approved fashion in openings greater than 4" diameter, or 4"x4" square cross section. Provide wire mesh grate over bags as recommended by the manufacturer subsequent to installation.

### 3.06 STAFFING

- A. Designate a qualified foreman. The foreman shall be present in the field at all times during the performance of the work.
- B. Provide a supervisory workforce sufficient to maintain efficient performance of the Contractor's responsibilities.
- C. Use only skilled and reliable workforce and discontinue the services of anyone employed on this project upon written request by the Commissioner.
- D. Use personnel who is qualified (at minimum) to perform the installation and testing work activities required under the contract.
- E. Provide and use the proper tools in good working order for the performance of the work. The Commissioner reserves the right to review the tools and tool maintenance procedures of the contractor and to require replacements be obtained.
- F. Telephone and data industry cable installation standards, TIA/EIA and BICSI standards, and manufacturers' instructions shall be used for in-process quality control and final acceptance of the work.

### 3.07 RECORD DRAWINGS

- A. During construction, the Contractor shall keep an accurate record of all deviations between the work as shown on the drawings and of work actually installed.
- B. Provide the City of New York with two (2) sets of installation diagrams, parts lists, shop drawings and manufacturers' information on equipment and cables provided by the Contractor. Submit information to the City of New York not more than one week after project completion.
- C. Upon completion of work and acceptance by the City of New York, provide as-built drawings of the complete system including, but not limited to, floor plans showing the exact location and type of each grounding busbar, grounding conductors, poke-through fitting, etc.
- D. As-built drawings shall indicate a unique ID number for all conduits/sleeves and other major pathway components provided. ID number shall include the floor the item occurs on.
- E. Submit a schedule of all conduit sleeve/pathway ID numbers.

### 3.08 ACCEPTANCE

- A. Once the testing has been completed, as-built and testing documentation delivered to the City of New York, and the Commissioner is satisfied that work is in accordance with the

contract documents, the Commissioner shall notify the contractor in writing of the acceptance of the work performed. The date of this acceptance shall constitute the commencement of the warranty period.

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## SECTION 270528

### COMMUNICATIONS PATHWAYS

#### PART 1 – GENERAL

##### 1.01 CONTRACT DOCUMENTS

- A. The requirements and recommendations of these Communications Pathways Specifications, together with the Communications Drawings (Drawing Series TE-001, TE-101, TE-102, TE-103, TE-104, TE-401, TE-501, TE-502, TE-503 and TE-701) shall be considered part of these Contract Documents.
- B. The general provisions of the Contract, including Division 01 General Conditions and the Addendum to the General Conditions, together with the following articles of the Communications Pathways Specifications, which amend, modify and supplement various articles and provisions of the General Conditions and the Addendum to the General Conditions, are made part of the Contract.
- C. All articles or parts of Division 01 General Conditions and the Addendum to the General Conditions not so amended, modified or supplemented by these Communications Pathways Specifications shall remain in full force and effect. Should any discrepancy become apparent between the General Conditions and these Specifications, the Contractor shall notify the Commissioner, in writing, and the Commissioner shall interpret and decide such matters in accordance with the provisions of the General Conditions.
- D. The requirements and recommendations of all Codes, Regulations and Standards referred to in Paragraph 1.07 and throughout these Specifications, shall be considered part of these Contract Documents.
- E. It is the intent of this Specifications document to provide a complete workable communications pathways system ready for the use of the City of New York. Any item not specifically shown on the drawings or called for in the Specifications, but normally required to conform to the intent, is to be considered part of the Contract.
- F. This Specifications document is equipment and performance Specifications. Actual installation shall be indicated on the Drawings. Any discrepancies found between the Specifications and the Drawings shall be brought to the attention of the Commissioner. Installation and details indicated on the Drawings shall govern if they differ from the Specifications.
- G. Certain terms such as “shall, provide, install, complete, etc.”, are not used in some parts of these Specifications. This does not indicate that the items shall be less than completely installed or that the system shall be less than complete.

##### 1.02 RELATED DOCUMENTS

- A. Division 270526 Communications Grounding and Bonding Specifications.
- B. Division 271000 Communications Cabling Specifications.

C. Division 26 Electrical Specifications.

### 1.03 CONTRACTOR QUALIFICATIONS

- A. The work shall be carried out by a specialist installer company.
- B. The selected Contractor shall have a proven track record in the field of Telephone, Data (Category 3, 5E and 6 and optical fiber) and Video (coaxial) cabling and associated pathways installation. Personnel shall be competent and qualified by experience and training for installation and testing of communications cabling plants including telephone, data and video distribution systems and associated cable pathways (cable trays, J-hooks, etc.).

### 1.04 QUANTITIES

- A. Unless otherwise indicated in this document or on the contract drawings, the quantities shall be based on the quantities shown on the contract drawings.

### 1.05 ABBREVIATIONS

- A. The following abbreviations are used on the Drawings and within the Specifications:

1. ANSI: American National Standards Institute.
2. ASTM: American Society of Testing Materials.
3. AWG: American Wire Gage.
4. CM: NEC cable rating: Communications Cable rated for general purpose use.
5. CMP: NEC cable rating: Communications Cable rated for use in plenum areas.
6. CMR: NEC cable rating: Communications Cable rated for use in riser areas.
7. dB: Decibel.
8. DTMF: Dual Tone Multi-Frequency.
9. EIA: Electronic Industries Association.
10. FCC: Federal Communications Commission.
11. ft: Feet.
12. IEEE: Institute of Electrical and Electronics Engineers.
13. in. Inch.

- |     |                  |   |
|-----|------------------|---|
| 14. | lb.              | Pound.  |
| 15. | LAN:             | Local Area Network.   |
| 16. | Mbps:            | Megabits per second.  |
| 17. | MHz:             | Mega Hertz.   |
| 18. | NEC:             | National Electrical Code.                                     |
| 19. | NFPA:            | National Fire Protection Association.                         |
| 20. | OFNP:<br>rating. | NEC Cable Rating: Optical Fiber Non-conductive Plenum rating. |
| 21. | OFNR:            | NEC Cable Rating: Optical Fiber Non-conductive Riser rating.  |
| 22. | OSHA:            | Occupational Safety and Health Act.                           |
| 23. | OTDR:            | Optical Time Domain Reflectometer.                            |
| 24. | PBX:             | Private Branch Exchange.                                      |
| 25. | pF:              | Pico Farad ( $10^{-12}$ Farad).                               |
| 26. | PVC:             | Polyvinyl Chloride.   |
| 27. | RMS:             | Rack Mount Space.   |
| 28. | RU:              | Rack Unit (same as RMS) = 1.75 inch.                          |
| 29. | TER              | Technology Equipment Room.                                    |
| 30. | TSER             | Technology Service Entrance Room.                             |
| 31. | TIA:             | Telecommunications Industries Association.                    |
| 32. | UTP:             | Unshielded Twisted Pair.                                      |
| 33. | UL:              | Underwriters' Laboratories, Inc.                              |

#### 1.06 DEFINITIONS

A. The following definitions apply to the Drawings and Specifications:

1. "ABANDONED COMMUNICATIONS CABLE" Existing Voice, Data or Video Communications Cable that is not terminated at both ends at a connector or other equipment and not identified for future use with a tag (NEC, Article 800-2).

2. "APPROVED" means as accepted and authorized, in writing, by the Commissioner.
3. "AS DIRECTED" means as directed by the Commissioner.
4. "CONCEALED" means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings.
5. "CONDUIT" or "CABLE TRAY" or "LADDER RACK" or "RUNWAY" or "CABLE RACEWAY" means the inclusion of all fittings, hangers, supports, sleeves, etc.
6. "EXPOSED" means not installed underground or "CONCEALED" as defined above.
7. "CLIENT" means the City of New York.
8. "INSTALL" means to move from property line, set in place, join, unite, fasten, link, attach, set up, or otherwise connect together before testing and turning over to the City of New York the particular work and materials referred to. Installation is to be completed and ready for regular operation for the particular work referred to.
9. "PROVIDE" or "FURNISH" means to supply, transport, place, erect, connect, test and turn over to the City of New York, complete and ready for regular operation, the particular work and materials referred to.
10. "SUPPLY" means to purchase, procure, acquire, and deliver complete with related accessories.
11. "WIRING" or "CABLING" means the inclusion of all fittings, conductors, connectors, connections, termination, and all other necessary and/or required in connection with such work.

#### 1.07 CODES, REGULATIONS AND STANDARDS

- A. Comply with the most recently issued requirements, standards, recommendations, rules, and regulations of:
  1. National Fire Protection Association (NFPA):
    - a. NFPA 70 - National Electrical Code (NEC).
    - b. NFPA 101.
    - c. NFPA 80.
  2. Federal Communications Commission (FCC), Title 47:
    - a. Part 15.

- b. Part 68.
  - 3. Federal, State, County, City Electrical codes, Ordinances and Regulations.
  - 4. Occupational Safety and Health Administration (OSHA).
  - 5. Americans with Disabilities Act (ADA).
  - 6. National Electrical Manufacturers' Association (NEMA).
  - 7. Underwriters Laboratories, Inc.:
    - a. UL Listed.
    - b. UL Approved.
  - 8. Institute of Electrical and Electronic Engineers (IEEE):
    - a. IEEE 802.3.
    - b. IEEE 802.11 (a, b, g, n).
  - 9. ANSI/TIA/EIA-568C – Commercial Building Telecommunications Cabling Standard.
  - 10. ANSI/TIA/EIA-569C – Commercial Building Standard for Telecommunications Pathways and Spaces.
  - 11. ANSI/TIA/EIA-606B – Administration Standard for Commercial Telecommunications Infrastructure.
  - 12. ANSI/J-STD-607-A – Commercial Building Grounding and Bonding Requirements for Telecommunications.
  - 13. BICSI - Building Industry Consulting Services International
  - 14. Manufacturers' recommendations
- B. Local Electrical and Building Codes may differ from national codes. Follow the most stringent code or recommendations. Where there are ambiguities, refer to the Commissioner for interpretation.
  - C. All equipment shall be equal to or exceed the minimum requirements of NEC, IEEE, ASME, ANSI, and UL.

#### 1.08 SYSTEM DESCRIPTION

- A. Woodstock Library is located at 761 East 160<sup>th</sup> Street, Bronx, NY 10456 and it is part of the New York Public Library system.
- B. Woodstock Library occupies a landmark building consisting of three floors and a cellar.

- C. The Library's Technology Service Entrance Room (TSER) and Technology Equipment Room (TER) are located in the cellar of the building.
- D. The Technology Equipment Room supports the communications needs for the entire building with no additional technology closets required on upper floors.
- E. The Technology Equipment Room shall be equipped with overhead cabling support as shown on the drawings.
- F. The Technology Service Entrance Room shall be equipped with overhead cabling support as shown on the drawings.

1.09 SCOPE OF WORK

- A. The work covered by this specification includes the construction described, all labor necessary to perform and complete such construction; all materials and equipment incorporated or to be incorporated in such construction; and all services, facilities, tools and equipment necessary or used to perform and complete such construction.
- B. Provide the following:
  - 1. Provide and install all fire rated plywood boards in the Technology Equipment Room and the Technology Service Entrance Room, as indicated on the drawings.
  - 2. Provide and install the overhead ladder rack cable tray in the Technology Equipment Room and the Technology Service Entrance Room, as shown on drawings.
  - 3. Provide and install J-hooks for overhead cable support where cable trays are not available, as shown on the drawings.
  - 4. Coordinate with the Electrical Contractor required communications conduit and sleeve work and materials such that there are no gaps and/or overlaps in installation and material procurement. Provide and install communications conduits and sleeves, conduit and sleeve bushings, couplings, connectors, adapters, fittings and supports, etc. necessary for complete and proper installation.
  - 5. Provide and install all necessary pull cords, warning tapes and conduit end tags.
  - 6. Provide and install labeling and documentation of all cable trays and hardware installed under this contract.
  - 7. Provide and install all cable tray grounding and bonding as required by the manufacturer and these Contract Documents.
  - 8. Testing and test documentation as described below.

9. Provide and install fire-stopping for wall and floor penetrations and openings through rated walls and floors after installation of telecommunications cabling and pathways.
  10. Provide and install all non-specified miscellaneous hardware, including, but not limited to nuts, bolts, wire rings, supporting hardware and similar components required for a complete cabling system installation.
- C. The Contractor shall review the Contract Documents with his/her electrical sub-contractor to ensure complete understanding of the drawings. Absolutely no allowance for additional compensation shall be made for any errors or omissions in the interpretation of any drawings, plans or specifications.

#### 1.10 RELATED WORK NOT INCLUDED

- A. Cutting, patching and painting.

#### 1.11 SUBMITTALS

- A. Submit manufacturers' product data sheets for all material and equipment products proposed in bid. Only specified or accepted manufacturers or suppliers shall appear in the product data submittal. Provide physical samples of products if directed by the Commissioner.
- B. Where substitutions or alternates are requested for any specified manufacturer or product, submit complete documentation for the product proposed, including complete product data and catalog cut sheets, engineering test and performance reports and any other information pertinent to the product. Orders of materials not specified or pre-approved by the Commissioner shall be at the Contractor's risk. No reshipping or restocking charges shall be accepted by the City of New York.
- C. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location and date of original installation.
- D. Submit shop drawings for approval ten (10) days prior to start of work and prior to the ordering of material, including:
1. Detailed drawings of assemblies of standard components that are custom assembled for specific application on this project.
  2. Functional block diagrams to show single-line interconnections between components for signal transmission and grounding. Show cable pathway types and sizes.
  3. Dimensioned plans and elevations of equipment racks/cabinets, patch panels, etc. Show access and work space requirements.
  4. Wiring diagrams: cable tray grounding.
- E. Shop drawings shall consist of one (1) set of reproducible and three (3) sets of prints of drawings indicating device locations, device labels, installation elevations, wiring

diagrams to include devices connectivity, riser diagrams and manufacturers' data in accordance with the contract documents. All documentation must be keyed for cross-referencing. Shop drawings must include complete bill of materials. Failure to provide complete documentation as described above shall be cause for rejection.

#### 1.12 SYSTEM SIGN-OFF SUBMITTALS

##### A. As-built drawings:

1. At the completion of installation, furnish a complete set of as-built documents, including plan view and elevation drawings.
2. As-built drawings shall consist of one (1) set of reproducible and three (3) sets of prints.

##### B. Field quality-control test reports.

##### C. Warranty documentation as described in paragraph 1.19.

#### 1.13 JOB CONDITIONS

##### A. Inspection of Site Conditions:

1. Before starting work, visit the site and examine the conditions under which the work has to be performed. Report in writing any conditions, which might adversely affect the work.

##### B. Connections to existing systems:

1. Install new work and connect to existing work with minimum interference to existing facilities.
2. Do not interrupt active cables or networks unless specifically directed. Provide temporary shutdowns of existing services at no additional charges and only with written consent of the Commissioner. Scheduled shutdowns shall not interfere with the normal operation of existing facilities.
3. Connect new work to existing work in a neat and acceptable manner. Restore the existing disturbed work to its original condition.

##### C. Removal and relocation of existing work:

1. Disconnect, remove or relocate communications cable, materials, equipment, and other work noted and required by alterations, modifications, or changes in existing construction.
2. Identify and completely remove all existing communications cabling system parts that are not specifically designated to be re-used. Do not abandon, cut back or leave cable in cable pathways or conduits. Dispose of as directed.

#### 1.14 COORDINATION OF THE WORK

- A. Coordinate project and schedule work with the general contractor in accordance with the schedule and construction sequence.
- B. Wherever work interconnects with work of other trades, provide the information necessary to properly install all the connections and equipment. Identify items of work that require access so that the ceiling trade will know where to install access doors and panels, and where to leave ceiling spaces accessible for wiring installation.
- C. Attend all construction meetings as requested by the Commissioner.
- D. Maintain a complete file of shop drawings available at all times to the Commissioner.
- E. Prior to actual installation, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper compliance with the design intent.

#### 1.15 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Delivery of Materials: The contractor shall be responsible for the receipt, delivery and safe storage of materials and equipment to the job site. Deliver materials (except bulk materials) in manufacturers' unopened containers.
- B. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.
- C. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and weather until installation. Replace equipment damaged in the course of handling without additional charge.
- D. Arrange for and provide storage space or area at the job site for materials and equipment to be received and/or installed in this project.

#### 1.16 PROTECTION OF MATERIALS

- A. Protect from damage, water, dust, etc. materials, equipment and apparatus provided under this trade, both in storage and installed.

#### 1.17 QUALITY ASSURANCE

- A. The contractor or subcontractor performing the work of this section must, within the last three (3) consecutive years prior to the bid opening, have successfully completed in a timely fashion projects similar in scope and type to the required work.
- B. Furnish materials and equipment new, free from defects and with listings or labels as defined in NFPA 70, Article 100, by a testing agency (Underwriter's Laboratories, Inc., etc.) acceptable to authorities having jurisdiction and marked for intended use.
- C. Materials and equipment provided and installed under the contract shall comply with NECA 1 and NFPA 70.

- D. Items of a given type shall be the product of the same manufacturer.
- E. Materials and equipment shall be the product of manufacturers regularly engaged in their manufacture.

#### 1.18 ACCESSIBILITY

- A. Install work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.

#### 1.19 WARRANTY

- A. Warranty all portions of the work against faulty and improper material for a minimum period of twenty (20) years from the date of final acceptance by the City of New York. Warranty all portions of the work against workmanship for a minimum period of one (1) year from the date of final acceptance by the City of New York. Where warranty for a longer term is offered through a manufacturer/installer certification program, such longer term shall apply.

Repair or replacement service during warranty period shall be performed 24 hours a day, seven days a week, with a four-hour response time.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS

- A. Any given item of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item shall not be permitted, unless specifically noted otherwise or approved by the Commissioner.
- B. Substitutions or alternates for the manufacturers listed will not be permitted without the written consent of the Commissioner. Refer to Section 1.11 – Submittals, for further information.

#### 2.02 APPROVED MANUFACTURERS

- A. Cable Tray:
  - 1. Chatsworth Products Inc. (CPI)  
31425 Agoura Road  
Westlake Village, CA 91361  
Tel: (800) 834-4969  
[www.chatsworth.com](http://www.chatsworth.com)
  - 2. Cooper B-Line / GS Metals (acquired by Cooper B-Line)  
509 W. Monroe Street  
Highland, IL 62249  
Tel: (618) 654 2184  
[www.b-line.com](http://www.b-line.com)

3. Legrand / Cablofil (acquired by Legrand)  
8319 Route 4  
Mascoutah, IL 62258  
Tel: (618) 566 3244  
[www.legrand.us](http://www.legrand.us)
4. Legrand / Wiremold (acquired by Legrand)  
60 Woodlawn Street  
West Hartford, CT 06110  
Tel: (800) 621 0049  
[www.wiremold.com](http://www.wiremold.com)
5. Mono-Systems Inc.  
4 International Drive  
Rye Brook, NY 10573  
[www.monosystems.com](http://www.monosystems.com)
6. Hubbell Premise Wiring  
14 Lord's Hill Road  
Stonington, CT 06378  
Tel: (860) 535 8326  
[www.hubbell-premise.com](http://www.hubbell-premise.com)

B. J-Hooks:

1. Erico  
30575 Bainbridge Road, Suite 300  
Solon, OH 44139  
Tel: 440 349 2630  
[www.erico.com](http://www.erico.com)
2. Chatsworth Products Inc. (CPI)  
31425 Agoura Road  
Westlake Village, CA 91361  
Tel: (800) 834-4969  
[www.chatsworth.com](http://www.chatsworth.com)
3. Legrand / Wiremold  
60 Woodlawn Street  
West Hartford, CT 06110  
Tel: (800) 621 0049  
[www.wiremold.com](http://www.wiremold.com)
4. Hubbell Premise Wiring  
14 Lord's Hill Road  
Stonington, CT 06378  
Tel: (860) 535 8326  
[www.hubbell-premise.com](http://www.hubbell-premise.com)
5. Cooper B-Line

509 W. Monroe Street  
Highland, IL 62249  
Tel: (618) 654 2184  
[www.b-line.com](http://www.b-line.com)

C. "U" channel Struts:

1. Atkore International / Unistrut  
16100 South Lathrop Avenue  
Harvey, IL 60426  
Tel: (800) 882 5543  
[www.unistrut.com](http://www.unistrut.com)
2. Thomas & Betts / Kindorf  
8155 T&B Boulevard  
Memphis, TN 38125  
Tel: (800) 816 7809  
[www.tnb.com](http://www.tnb.com)
3. Cooper B-Line  
509 W. Monroe Street  
Highland, IL 62249  
Tel: (618) 654 2184  
[www.b-line.com](http://www.b-line.com)

D. All Threaded Rod:

1. Atkore International / Unistrut  
16100 South Lathrop Avenue  
Harvey, IL 60426  
Tel: (800) 882 5543  
[www.unistrut.com](http://www.unistrut.com)
2. Thomas & Betts / Kindorf  
8155 T&B Boulevard  
Memphis, TN 38125  
Tel: (800) 816 7809  
[www.tnb.com](http://www.tnb.com)
3. Cooper B-Line  
509 W. Monroe Street  
Highland, IL 62249  
Tel: (618) 654 2184  
[www.b-line.com](http://www.b-line.com)

E. Conduit, Pull Boxes, Distribution Boxes: :

1. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems".

F. Sleeves for Pathways and Cables:

1. Atkore International / Unistrut  
16100 South Lathrop Avenue  
Harvey, IL 60426  
Tel: (800) 882 5543  
[www.unistrut.com](http://www.unistrut.com)
2. Thomas & Betts / Kindorf  
8155 T&B Boulevard  
Memphis, TN 38125  
Tel: (800) 816 7809  
[www.tnb.com](http://www.tnb.com)
3. Cooper B-Line  
509 W. Monroe Street  
Highland, IL 62249  
Tel: (618) 654 2184  
[www.b-line.com](http://www.b-line.com)
4. Hubbell Incorporated  
40 Waterview Drive  
Shelton, CT 06484  
Tel: (475) 882 4000  
[www.hubbell.com](http://www.hubbell.com)

G. Fire Rated Plywood Boards:

1. Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry".

2.03 CABLE TRAYS

A. Overhead Ladder Runway Cable Trays

1. Provide and install welded 12" wide, straight standard sections, painted black. Install complete with all necessary splice plates, bends, bracket mounts, connection and support hardware for field configuration and installation.
2. Use:
  - a. In the Technology Equipment Room for cabling system management and routing, as shown on the drawings.
  - b. In the Technology Service Entrance Room for cable system management and routing, as shown on the drawings.
3. All sections of the overhead cable tray shall be installed at the same height, as indicated on the drawings. Cable tray shall be supported from ceiling slab.

4. Quantity as shown on the drawings.
5. Contractor shall ground all sections of cable tray per manufacturer directions to the telecommunications grounding bus-bars (TMGB, TGB) located in same room and in proximity.
6. Manufacturers: Chatsworth Products Inc (CPI)  
 Cable Tray Part No.: UL Classified Cable Runway 11275-712 (12" cable tray, Color Black)  
 Cable Radius Drop Part No.: 12100-712 (#' of devices as required – determine in field). To be used as bend radius device for all cables exiting cable tray.  
 Butt Splice Kit: 11301-7 (Color Black)  
 Ceiling Mounting Kit: 11310-03  
 Cable Runway Ground Straps: 40164  
 Cable Runway Ground Wire: 40159  
 Or approved equivalent.

#### 2.04 CABLE SUPPORT CLIPS

##### A. Cable Support Clips (J-Hooks).

1. Wide base cable support clips or adjustable cable supports. Use for station cable runs of 5 feet or less cables in accessible ceiling areas.
2. Manufacturer: Erico Caddy "CableCat"  
 Part No: CAT-12 thru 32 Series or CAT-425 Series  
 Rings Part No.: Caddy Plain 2BRT12  
 Retainer Part No.: Caddy Cable Retainer CATCR50  
 Or approved equivalent.

#### 2.05 CABLE TIES

##### A. Cable Ties

1. Wide hook and loop type. To permit easy release and re-entry and prevent over-tensioning of high performance UTP and optical cables
2. DO NOT USE narrow plastic or nylon-type non-re-enterable cable ties ("Ty-Wraps").
3. Size and quantity as required.
4. Manufacturer: Erico Mille-Tie  
 Part No. CATMTP  
 Or approved equivalent

#### 2.06 "U" CHANNEL STRUT

##### A. As required.

2.07 ALL THREADED ROD

- A. 1/4", 3/8" and 1/2" as required. Mount 3/8" all-threaded rod into deck plates with 8,000 lbs. pulling force (min.) anchors fastened into the deck plates and concrete in a manner compliant with building practices and applicable codes.

2.08 CONDUIT

- A. EMT with corrosion resistant finish. Use only in normally dry, protected locations. Do not use in contact with soil or concrete. Minimum 1-inch trade size complete with all sweeps, elbows, bushings, compression fittings and hardware required for a complete installation (size and quantity as required).
- B. Rigid steel conduit with galvanized finish. Use in damp or un-protected locations. Minimum 1-inch trade size complete with all sweeps, elbows, bushings, compression fittings and hardware required for a complete installation (size and quantity as required).
- C. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems".

2.09 STEEL SLEEVES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

2.10 PULL BOXES AND DISTRIBUTION BOXES

- A. Sized as shown on drawings. 12 Ga. Steel or better with screw mounted and hinged covers as indicated.
- B. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems".

2.11 FIRE RETARDANT PLYWOOD BOARDS

- A. Provide and install fire retardant plywood backboards as shown on the drawings. Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry".
- B. Use:
  - 1. In the Technology Equipment Room, as shown on the drawings.
  - 2. In the Technology Service Entrance Room, as shown on the drawings.
- C. Unit size: 48"(W) x 96"(H) x 3/4"(D).
- D. Paint the backboards with two coats of fire-retardant, dust reducing paint the same color as the room walls
- E. Quantity as shown on the drawings

## 2.12 LABELS

- A. Communications Contractor to confirm all labeling schemes with the Commissioner prior to commencing work.

## PART 3 – EXECUTION

### 3.01 GENERAL

- A. Follow manufacturers' instructions for installing Communications Cable Pathways system. Where instructions are unavailable, follow approved industry practice.
- B. Examine and compare the communications drawings and specifications with the drawings and specifications of other trades, report any discrepancies to the Commissioner and obtain written instructions for changes necessary in the work. Include most stringent requirements in the bid.
- C. Repairs or changes caused by the Contractor's neglect shall be made at the contractor's expense. Protect the finished work of other trades from damage or defacement and remedy any damages as required.
- D. Clean up all debris generated by installation activities and discard of as directed by the Commissioner.

### 3.02 PATHWAYS INSTALLATION

- A. Install and coordinate the telecommunications pathways work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interferences in a manner accepted by the Commissioner.
- B. The locations of ladder racks, conduits, and other equipment indicated on the drawings are approximately correct and are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed.
- C. Maintain a minimum of 12" separation between telecommunication pathways running parallel to electrical cables or conduits. When crossing, maintain a 3" minimum separation and cross only at 90°. Maintain a minimum 12" separation from all fluorescent light fixtures.
- D. Keep all items protected before and after installation, with dust and moisture proof barrier materials. Maintain the integrity of these protective measures until installation is complete and accepted by the City of New York.

### 3.03 CABLE TRAY INSTALLATION

- A. Field cut tray as required to suit length requirements. Remove burrs and sharp edges from cut pieces. Resultant trough spacing between adjacent sections not to exceed that indicated.

- B. Locate extension splice connector plates according to manufacturer's requirements. Field cut tray to suit splice locations where necessary.
- C. Locate splice connector plates outside of the side rails. Bolt adjacent tray sections with nuts and washers outside of the tray. Torque nuts to manufacturer's specified value.
- D. Position expansion splices properly and securely lock connector fasteners to permit tray to expand and contract freely.
- E. Suspend tray from slab with dual trapeze hangers uniformly spaced on opposite sides of the tray at the center and 6" from each end of each span. Securely anchor the tray to threaded rod supports with trapeze mounts placed at the second horizontal side rail of each tray.
- F. Brace the tray from solid anchorage to keep the system from moving during or after cable installation.
- G. Provide "radius drops" to maintain cable bending radii as required.
- H. Restore to new condition or replace all trays damaged during installation or cable pulling.
- I. Cut holes in side rails or troughs only as needed for splicing field cut sections.

#### 3.04 FIRE STOPPING

- A. When passing through partitions of floors, provide fire-stopping in the following manner:
  - 1. Stop trays 12 inches on either side of the partition or floor.
  - 2. Rigidly connect the appropriate raceway between the trays passing through the partition or floor. Raceways shall afford the same areas/capacity as the tray.
  - 3. Place fire-stop material at each end and around each conduit as specified for Electrical Penetration Fire Seals.
- B. Seal all penetrations through fire rated walls, floors and walls created by or made on behalf of the contractor so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the National Electric Code.
- C. Use sealant material that has passed fire exposure testing in accordance with standard time-temperature curve in the standard UL ASTM E 119 and NFPA 251 and the hose stream test in accordance with UL 10B.
- D. Provide removable fire-stopping pillows in an approved fashion in openings greater than 4" diameter, or 4"x4" square cross section. Provide wire mesh grate over bags as recommended by the manufacturer subsequent to installation.

#### 3.05 EMI/RFI AVOIDANCE

- A. To avoid electromagnetic interference (EMI) route cables to maintain the following minimum distances:

1. Twelve (12) inches from high voltage lighting.
  2. Thirty-six (36) inches from power lines of 5 KVA or greater.
  3. Forty (40) inches from transformers or motors.
- B. Maintain minimum twelve-inch separation between telecommunication cables running exposed in the ceiling or floor voids and parallel electrical cables/conduits.
- C. Telecommunication cables shall cross the electrical cables/conduits only at 90 degree angles.

### 3.06 CONDUITS AND BOXES

- A. Provide conduits, boxes and sleeves as noted on the drawings.
- B. For conduit runs, provide pull boxes and sizes, as noted on the drawings:
1. Every 100 feet in straight conduit runs.
  2. After every other 90 degree of bend or equivalent.
- C. Conduit runs shall not exceed 100 feet between pull boxes.
- D. Conduit runs shall not contain more than two (2) 90-degree bends between pull boxes. A third bend is acceptable only if within 12" of a pull box.
- E. No conduits shall contain more than two (2) 90-degree bends of less than 10 times the inside diameter of the conduit.
- F. Provide non-metallic draglines, with a minimum tensile strength of 600 pounds in each conduit and sleeve less than 2" ID and of 1,200 pounds in each conduit and sleeve equal to or greater than 2" ID provided under this work.
- G. Provide permanent, non-removable plastic or metal hanging tags on ends of conduits providing a unique ID number, the conduit length, and the originating and terminating destination of each respective conduit. Provide conduit tags for backbone conduits provided as part of the work.
- H. Provide bushings for conduit and sleeve ends.

### 3.07 GROUNDING

- A. Ground cable trays and raceways as prescribed in Article 318 of the N.E.C., in accordance with local code requirements and in accordance with the latest draft of J-STD-607-A "Grounding and Bonding Requirements for Commercial Building Telecommunications Systems".

- B. Where assembly is not approved as grounding means, use flat braided conductor strips to interconnect spine sections. Resistance between adjacent spine sections must not exceed 0.00033 ohms.

### 3.08 STAFFING

- A. Designate a qualified foreman. The foreman shall be present in the field at all times during the performance of the work.
- B. Provide a supervisory workforce sufficient to maintain efficient performance of the Contractor's responsibilities.
- C. Use only skilled and reliable workforce and discontinue the services of anyone employed on this project upon written request by the Commissioner.
- D. Use personnel who is qualified (at minimum) to perform all of the installation and testing work activities required under the contract.
- E. Provide and use the proper tools in good working order for the performance of the work. The Commissioner reserves the right to review the tools and tool maintenance procedures of the contractor and require replacements to be obtained.
- F. Telephone and data industry cable installation standards, TIA/EIA and BICSI standards, and manufacturers' instructions shall be used for in-process quality control and final acceptance of the work.

### 3.09 RECORD DRAWINGS

- A. During construction, the Contractor shall keep an accurate record of all deviations between the work as shown on the drawings and of work actually installed.
- B. Provide the City of New York with two (2) sets of installation diagrams, parts lists, shop drawings and manufacturers' information on equipment and cables provided by the Contractor. Submit information to the City of New York not more than one week after project completion.
- C. Upon completion of work and acceptance by the City of New York, provide as-built drawings of the complete system including, but not limited to, floor plans showing the exact location and type of each cable tray segment, cable ladder configuration, poke-through fitting, sleeves, etc.
- D. As-built drawings shall indicate a unique ID number for all conduits/sleeves and other major pathway components provided. ID number shall include the floor the item occurs on.
- E. Submit a schedule of all conduit sleeve/pathway ID numbers.

### 3.10 ACCEPTANCE

- A. Once the testing has been completed, as-built and testing documentation delivered to the City of New York, and the Commissioner is satisfied that all work is in accordance with

the contract documents, the Commissioner shall notify the contractor in writing of the acceptance of the work performed. The date of this acceptance shall constitute the commencement of the warranty period.

END OF SECTION

## SECTION 271000

### COMMUNICATIONS CABLING

#### PART 1 – GENERAL

##### 1.01 CONTRACT DOCUMENTS

- A. The requirements and recommendations of this Communications Cabling Specifications document, together with the Communications Drawings (Drawing Series TE-001, TE-101, TE-102, TE-103, TE-104, TE-401, TE-501, TE-502, TE-503 and TE-701), shall be considered part of these Contract Documents.
- B. The general provisions of the Contract, including Division 01 General Conditions and the Addendum to the General Conditions, together with the following articles of the Communications Cabling Specifications, which amend, modify and supplement various articles and provisions of the General Conditions and the Addendum to the General Conditions, are made part of the Contract.
- C. All articles or parts of Division 01 General Conditions and the Addendum to the General Conditions not so amended, modified or supplemented by this Communications Cabling Specifications document shall remain in full force and effect. Should any discrepancy become apparent between the General Conditions and this Specifications document, the Contractor shall notify the Commissioner, in writing, and the Commissioner shall interpret and decide such matters in accordance with the provisions of the General Conditions.
- D. The requirements and recommendations of all Codes, Regulations and Standards referred to in Paragraph 1.07 and throughout this Specifications document, shall be considered part of these Contract documents.
- E. It is the intent of this Specifications document to provide a complete workable communications cabling system ready for the use of the City of New York. Any item not specifically shown on the drawings or called for in the Specifications, but normally required to conform to the intent, is to be considered part of the Contract.
- F. This Specifications document is equipment and performance Specifications. Actual installation shall be as indicated on the Drawings. Any discrepancies found between the Specifications and the Drawings shall be brought to the attention of the Commissioner. Installation and details indicated on the Drawings shall govern if they differ from the Specifications.
- G. Certain terms such as “shall, provide, install, complete, etc.”, are not used in some parts of this Specifications document. This does not indicate that the items shall be less than completely installed or that the system shall be less than complete.

##### 1.02 RELATED DOCUMENTS

- A. Division 270526 Communications Grounding and Bonding Specifications.

- B. Division 270528 Communications Pathways Specifications.
- C. Division 26 Electrical Specifications.

1.03 CONTRACTOR QUALIFICATIONS

- A. The work shall be carried out by a specialist installer company.
- B. The selected Contractor shall have a proven track record in the field of Telephone, Data (Category 3, 5E and 6 and optical fiber) and Video (coaxial) cabling installation. Personnel shall be competent and qualified by experience and training for installation and testing of communications cabling plants including telephone, data and video distribution systems.

1.04 QUANTITIES

- A. Unless otherwise indicated in this document or on the Contract Drawings, the quantities shall be based on the quantities shown on the Contract Drawings.

1.05 ABBREVIATIONS

- A. The following abbreviations are used on the Drawings and within the Specifications:

- 1. ANSI: American National Standards Institute
- 2. ASTM: American Society of Testing Materials
- 3. AWG: American Wire Gage
- 4. CM: NEC cable rating: Communications Cable rated for general purpose use.
- 5. CMP: NEC cable rating: Communications Cable rated for use in plenum areas.
- 6. CMR: NEC cable rating: Communications Cable rated for use in riser areas.
- 7. dB: Decibel.
- 8. DTMF: Dual Tone Multi-Frequency.
- 9. EIA: Electronic Industries Association.
- 10. FCC: Federal Communications Commission.
- 11. ft: Feet.
- 12. IEEE: Institute of Electrical and Electronics Engineers.

- |     |       |  |
|-----|-------|--|
| 13. | in.   | Inch.  |
| 14. | lb.   | Pound.   |
| 15. | LAN:  | Local Area Network.  |
| 16. | Mbps: | Megabits per second.   |
| 17. | MHz:  | Mega Hertz.  |
| 18. | NEC:  | National Electrical Code.                                    |
| 19. | NFPA: | National Fire Protection Association.                        |
| 20. | OFNP: | NEC Cable Rating: Optical Fiber Non-conductive Plenum rated. |
| 21. | OFNR: | NEC Cable Rating: Optical Fiber Non-conductive Riser rated.  |
| 22. | OSHA: | Occupational Safety and Health Act.                          |
| 23. | OTDR: | Optical Time Domain Reflectometer.                           |
| 24. | PBX:  | Private Branch Exchange.                                     |
| 25. | pF:   | Pico Farad ( $10^{-12}$ Farad).                              |
| 26. | PVC:  | Polyvinyl Chloride.  |
| 27. | RMS:  | Rack Mount Space.  |
| 28. | RU:   | Rack Unit (same as RMS) = 1.75 inch.                         |
| 29. | TER   | Technology Equipment Room.                                   |
| 30. | TSER  | Technology Service Entrance Room.                            |
| 31. | TIA:  | Telecommunications Industries Association.                   |
| 32. | UTP:  | Unshielded Twisted Pair.                                     |
| 33. | UL:   | Underwriters' Laboratories, Inc.                             |

## 1.06 DEFINITIONS

A. The following definitions apply to the Drawings and Specifications:

1. "ABANDONED COMMUNICATIONS CABLE" Existing Voice, Data or Video Communications Cable that is not terminated at both ends at a connector or other equipment and not identified for future use with a tag (NEC, Article 800-2).

2. "APPROVED" means as accepted and authorized, in writing, by the Commissioner.
3. "AS DIRECTED" means as directed by the Commissioner.
4. "CONCEALED" means embedded in masonry or other construction, installed behind wall furring or within double partitions, or installed within hung ceilings.
5. "CONDUIT" or "CABLE TRAY" or "LADDER RACK" or "RUNWAY" or "CABLE RACEWAY" means the inclusion of all fittings, hangers, supports, sleeves, etc.
6. "EXPOSED" means not installed underground or "CONCEALED" as defined above.
7. "CLIENT" means the City of New York.
8. "INSTALL" means to move from property line, set in place, join, unite, fasten, link, attach, set up, or otherwise connect together before testing and turning over to the City of New York the particular work and materials referred to. Installation is to be completed and ready for regular operation for the particular work referred to.
9. "PROVIDE" or "FURNISH" means to supply, transport, place, erect, connect, test and turn over to the City of New York, complete and ready for regular operation, the particular work and materials referred to.
10. "SUPPLY" means to purchase, procure, acquire, and deliver complete with related accessories.
11. "WIRING" or "CABLING" means the inclusion of all fittings, conductors, connectors, connections, termination, and all other necessary and/or required in connection with such work.

#### 1.07 CODES, REGULATIONS AND STANDARDS

- A. Comply with the most recently issued requirements, standards, recommendations, rules, and regulations of:
  1. National Fire Protection Association (NFPA):
    - a. NFPA 70 - National Electrical Code (NEC).
    - b. NFPA 101.
    - c. NFPA 80.
  2. Federal Communications Commission (FCC), Title 47:
    - a. Part 15.

- b. Part 68.
  - 3. Federal, State, County, City Electrical codes, Ordinances and Regulations.
  - 4. Occupational Safety and Health Administration (OSHA).
  - 5. Americans with Disabilities Act (ADA).
  - 6. National Electrical Manufacturers' Association (NEMA).
  - 7. Underwriters Laboratories, Inc.:
    - a. UL Listed.
    - b. UL Approved.
  - 8. Institute of Electrical and Electronic Engineers (IEEE):
    - a. IEEE 802.3.
    - b. IEEE 802.11 (a, b, g, n).
  - 9. ANSI/TIA/EIA-568C – Commercial Building Telecommunications Cabling Standard.
  - 10. ANSI/TIA/EIA-569C – Commercial Building Standard for Telecommunications Pathways and Spaces.
  - 11. ANSI/TIA/EIA-606B – Administration Standard for Commercial Telecommunications Infrastructure.
  - 12. ANSI/J-STD-607-A – Commercial Building Grounding and Bonding Requirements for Telecommunications.
  - 13. BICSI - Building Industry Consulting Services International.
  - 14. Manufacturers' recommendations.
- B. Local Electrical and Building Codes may differ from national codes. Follow the most stringent code or recommendations. Where there are ambiguities, refer to the Commissioner for interpretation.
- C. All equipment shall be equal to or exceed the minimum requirements of NEC, IEEE, ASME, ANSI, and UL.

#### 1.08 SYSTEM DESCRIPTION

- A. Woodstock Library is located at 761 East 160<sup>th</sup> Street, Bronx, NY 10456 and it is part of the New York Public Library system.

- B. Woodstock Library occupies a landmark building consisting of three floors and a cellar.
- C. The Library's Technology Service Entrance Room (TSER) and Technology Equipment Room (TER) are located in the cellar of the building.
- D. The Technology Equipment Room supports the communications needs of the entire building with no additional technology closets required on upper floors.
- E. The Library's Security Equipment Room is located adjacent to the Technology Equipment Room. The two rooms are separated by a chain-link fence only.
- F. Work area outlets are either wall mounted or installed in recessed floor boxes. The floor boxes are shared between the Communications and the Electric Power distribution systems. The floor boxes are provided and installed by Division 26 – Electrical.
- G. Work area outlets/telecommunications outlets are configured with one, two or three ports/connector inserts.
- H. Work area outlets/ports are connected to the Technology Equipment Room via ANSI/EIA/TIA Category 6 4-UTP plenum rated cables.
- I. The work area outlets will support analog voice and fax lines, IP voice telephony, data network and wireless data.
- J. The IP telephony and data network systems will support the regular operations and activities of the Library.
- K. The analog voice and fax lines are intended to provide back-up communications means to the main IP telephone and data network systems. The analog voice and fax lines will bypass the main IP telephone system and will connect directly to the local telephone service provider.
- L. At the outlet end, all station cables will be terminated on ANSI/EIA/TIA 568 Category 6 compliant connectors configured with T568B wiring scheme.
- M. In the Technology Equipment Room, all station cables will be terminated on rack mounted, Category 6 RJ45 8-pin modular patch panels with T568B wiring scheme. Station cables shall be terminated in sequential order.
- N. In the Technology Equipment Room the IP telephony, data network and wireless network station cables will be patched to the network equipment via Category 6 4-UTP patch cords, factory terminated on connectors with T568B wiring scheme.
- O. In the Technology Equipment Room the analog voice and fax lines will be cross-connected to the ANSI/EIA/TIA 568B Category 5e compliant, 25-pair tie/backbone cable that connects the TER room to the TSER room.
- P. In the TER room the tie/backbone cable shall be terminated on rack mounted, 110-type termination blocks equipped with 4-pair connecting blocks.

- Q. In the TSER room the tie/backbone cable shall be terminated on rack mounted, 110-type termination blocks equipped with 5-pair connecting blocks.
- R. The local service providers demarcation points (telephone, CATV, etc.) will be relocated from their current locations to the TSER room.

#### 1.09 SCOPE OF WORK

- A. The work covered by this specification includes the construction described, labor necessary to perform and complete such construction, materials and equipment incorporated or to be incorporated in such construction, and services, facilities, tools and equipment necessary or used to perform and complete such construction.
- B. Provide the following:
  - 1. Provide and install all cabinets in the Technology Equipment Room and the Technology Service Entrance Room, as shown on the drawings.
  - 2. Provide, install and terminate all telecommunications station cabling on the Cellar, First, Second and Third floors, as shown on drawings.
  - 3. Provide, install and terminate all telecommunications station cabling in the Technology Equipment Room, as shown on drawings.
  - 4. Provide, install and terminate all tie/backbone cables between the Technology Equipment Room and the Technology Service Entrance Room, as shown on the drawings.
  - 5. Provide and install all 4-UTP patch cords in the Technology Equipment Room from station cables patch panels to the network equipment ports. Coordinate station cable patch panel to electronic equipment (IP telephone switches, data switches, routers, etc.) port mapping with the IT department of the City of New York.
  - 6. Provide and install all analog voice and fax patch cords and cross-connect cables and wires in the Technology Equipment Room from station cables termination blocks to the TER/TSER tie/backbone cable.
  - 7. Provide and install all 4-UTP patch cords at the work area end as describer below.
  - 8. Provide and install all station cable wire managers, cross connect supports and guide rings in the Technology Equipment Room as required for a complete installation.
  - 9. Provide and install all jacks, connectors, terminating devices, faceplates, and similar components required for a complete installation.

10. Provide and install all cable supports, including mounting and installation hardware, within ceilings, except for the cable tray, sleeves and conduits provided under the Communications Pathways Specifications.
  11. Provide and install labeling and documentation of all cables, racks, outlets, and hardware installed under this contract.
  12. Provide cable pull schedule for all areas in scope.
  13. Provide testing and test documentation as described below.
  14. Provide and install fire-stop materials for penetrations/openings through fire rated walls and floors after installation of telecommunications cabling.
  15. Provide and install all non-specified miscellaneous hardware, including, but not limited to nuts, bolts, re-enterable cable ties, spiral wrap, wire rings, supporting hardware and similar components required for a complete cabling system installation.
  16. Remove all abandoned telecommunications cabling as required for compliance with the National Electrical Code.
  17. Coordinate Service Provider demarcation point equipment relocation from their current locations to the Technology Service Entrance Room with the City of New York, the Service Providers contractors, general contractor and all concerned parties. Service Provider equipment relocation work other than construction coordination, is not included in the scope of this contract.
- C. The Contractor shall review the Contract Documents with his/her electrical sub-contractor to ensure complete understanding of the drawings. Absolutely no allowance for additional compensation shall be made for any errors or omissions in the interpretation of any drawings, plans or specifications.

#### 1.10 RELATED WORK NOT INCLUDED

- A. Cutting, patching and painting.

#### 1.11 SUBMITTALS

- A. Submit manufacturers' product data sheets for material and equipment products proposed in bid. Only specified or accepted manufacturers or suppliers shall appear in the product data submittal. Provide physical samples of products if directed by the Commissioner.
- B. Where substitutions or alternates are requested for any specified manufacturer or product, submit complete documentation for the product proposed, including complete product data and catalog cut sheets, engineering test and performance reports and any other information pertinent to the product. Orders of materials not specified or pre-approved by the Commissioner shall be at the Contractor's risk. No reshipping or restocking charges shall be accepted by the City of New York.

- C. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location and date of original installation.
- D. Submit shop drawings for approval ten (10) days prior to start of work and prior to the ordering of material, including:
  - 1. Detailed drawings of assemblies of standard components that are custom assembled for specific application on this project.
  - 2. Functional block diagrams to show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
  - 3. Dimensioned plans and elevations of equipment racks/cabinets, patch panels, etc. Show access and work space requirements.
  - 4. Wiring diagrams: power, signal and control wiring and grounding.
- E. Shop drawings shall consist of one (1) set of reproducible and three (3) sets of prints of drawings indicating device locations, device labels, wall and rack elevations, wiring diagrams to include devices connectivity, riser diagrams and manufacturers' data in accordance with the contract documents. All documentation must be keyed for cross-referencing. Shop drawings must include complete bill of materials. Failure to provide complete documentation as described above shall be cause for rejection.

#### 1.12 SYSTEM SIGN-OFF SUBMITTALS

- A. As-built drawings:
  - 1. At the completion of installation, furnish a complete set of as-built documents, including plan view and elevation drawings and cable pull schedules.
  - 2. As-built drawings shall consist of one (1) set of reproducible and three (3) sets of prints.
  - 3. Cable pull schedules shall be provided in one (1) hard copy and one (1) computer CD format.
- B. Field quality-control test reports.
- C. Warranty documentation as described in paragraph 1.19.

#### 1.13 JOB CONDITIONS

- A. Inspection of Site Conditions:
  - 1. Before starting work, visit the site and examine the conditions under which the work has to be performed. Report in writing any conditions, which might adversely affect the work.
- B. Connections to existing systems:

1. Install new work and connect to existing work with minimum interference to existing facilities.
  2. Do not interrupt active cables or networks unless specifically directed. Provide temporary shutdowns of existing services at no additional charges and only with written consent of the Commissioner. Scheduled shutdowns shall not interfere with the normal operation of existing facilities.
  3. Connect new work to existing work in a neat and acceptable manner. Restore the existing disturbed work to its original condition including preservation of wiring continuity required.
- C. Removal and relocation of existing work:
1. Disconnect, remove or relocate communications cable, materials, equipment, and other work noted and required by alterations, modifications, or changes in existing construction.
  2. Identify and completely remove existing communications cabling system that is not specifically designated to be re-used. Do not abandon, cut back or leave cable in cable pathways or conduits. Dispose of as directed.

#### 1.14 COORDINATION OF THE WORK

- A. Coordinate project and schedule work with the general contractor in accordance with the schedule and construction sequence.
- B. Wherever work interconnects with work of other trades, provide the information necessary to properly install all the connections and equipment. Identify items of work that require access so that the ceiling trade will know where to install access doors and panels, and where to leave ceiling spaces accessible for wiring installation.
- C. Attend all construction meetings as requested by the Commissioner.
- D. Maintain a complete file of shop drawings available at all times to the Commissioner.
- E. Prior to actual installation, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper compliance with the design intent.

#### 1.15 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Delivery of Materials: The contractor shall be responsible for the receipt, delivery and safe storage of materials and equipment to the job site. Deliver materials (except bulk materials) in manufacturers' unopened containers.
- B. Ship materials and equipment in crated sections of sizes to permit passing through available space, where required.

- C. Receive and accept materials and equipment at the site, properly handle, house, and protect them from damage and weather until installation. Replace equipment damaged in the course of handling without additional charge.
- D. Arrange for and provide storage space or area at the job site for materials and equipment to be received and/or installed in this project.

#### 1.16 PROTECTION OF MATERIALS

- A. Protect from damage, water, dust, etc. materials, equipment and apparatus provided under this trade, both in storage and installed.

#### 1.17 QUALITY ASSURANCE

- A. The contractor or subcontractor performing the work of this section must, within the last three (3) consecutive years prior to the bid opening, have successfully completed in a timely fashion projects similar in scope and type to the required work.
- B. Furnish materials and equipment new, free from defects and with listings or labels as defined in NFPA 70, Article 100, by a testing agency (Underwriter's Laboratories, Inc., etc.) acceptable to authorities having jurisdiction and marked for intended use.
- C. Materials and equipment provided and installed under the contract shall comply with NECA 1 and NFPA 70.
- D. Items of a given type shall be the product of the same manufacturer.
- E. Materials and equipment shall be the product of manufacturers regularly engaged in their manufacture.

#### 1.18 ACCESSIBILITY

- A. Install work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Minor deviations from the drawings may be made to accomplish this, but changes of substantial magnitude shall not be made without written approval.

#### 1.19 WARRANTY

- A. Warranty all portions of the work against faulty and improper material for a minimum period of sixteen (16) years from the date of final acceptance by the City of New York. Warranty all portions of the work against workmanship for a minimum period of one (1) year from the date of final acceptance by the City of New York. Where warranty for a longer term is offered through a manufacturer/installer certification program, such longer term shall apply.
- B. Repair or replacement service during warranty period shall be performed 24 hours a day, seven days a week, with a four-hour response time.

### PART 2 – PRODUCTS

## 2.01 MATERIALS

- A. Any given item of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item shall not be permitted, unless specifically noted otherwise or approved by the Commissioner.
- B. Substitutions or alternates for the manufacturers listed will not be permitted without the written consent of the Commissioner. Refer to Section 1.11 – Submittals, for further information.

## 2.02 APPROVED MANUFACTURERS

### A. Cable:

- 1. CommScope Inc. / Uniprise Solutions  
1100 CommScope Place SE  
Hickory, North Carolina 28602  
Tel: (800) 982 1708  
[www.commscope.com](http://www.commscope.com)
- 2. Hubbell Premise Wiring  
14 Lord's Hill Road  
Stonington, CT 06378  
Tel: (860) 535 8326  
[www.hubbell-premise.com](http://www.hubbell-premise.com)
- 3. TE Connectivity (old Tyco Electronics)/ADC TrueNet  
13625 Technology Drive  
Eden Prairie, MN 55344  
Tel: (800) 366 3891  
[www.adc.com](http://www.adc.com)
- 4. TE Connectivity (old Tyco Electronics)/AMP NetConnect  
Greensboro, NC  
Tel: (800) 553 0983  
[www.ampnetconnect.com](http://www.ampnetconnect.com)

### B. Outlet Faceplates and Connectors

- 1. The Siemon Company  
Siemon Business Park  
101 Siemon Company Drive  
Watertown, CT 06795  
Tel: (860) 945 4200  
[www.siemon.com](http://www.siemon.com)
- 2. CommScope Inc. / Uniprise Solutions  
1100 CommScope Place SE

Hickory, North Carolina 28602  
Tel: (800) 982 1708  
[www.commscope.com](http://www.commscope.com)

3. Hubbell Premise Wiring  
14 Lord's Hill Road  
Stonington, CT 06378  
Tel: (860) 535 8326  
[www.hubbell-premise.com](http://www.hubbell-premise.com)
4. TE Connectivity (old Tyco Electronics)/ADC TrueNet  
13625 Technology Drive  
Eden Prairie, MN 55344  
Tel: (800) 366 3891  
[www.adc.com](http://www.adc.com)
5. TE Connectivity (old Tyco Electronics)/AMP NetConnect  
Greensboro, NC  
Tel: (800) 553 0983  
[www.ampnetconnect.com](http://www.ampnetconnect.com)

C. Patch Panels, Terminations, Connectors

1. The Siemon Company  
Siemon Business Park  
101 Siemon Company Drive  
Watertown, CT 06795  
Tel: (860) 945 4200  
[www.siemon.com](http://www.siemon.com)
2. CommScope Inc. / Uniprise Solutions  
1100 CommScope Place SE  
Hickory, North Carolina 28602  
Tel: (800) 982 1708  
[www.commscope.com](http://www.commscope.com)
3. Hubbell Premise Wiring  
14 Lord's Hill Road  
Stonington, CT 06378  
Tel: (860) 535 8326  
[www.hubbell-premise.com](http://www.hubbell-premise.com)
4. TE Connectivity (old Tyco Electronics)/ADC TrueNet  
13625 Technology Drive  
Eden Prairie, MN 55344  
Tel: (800) 366 3891  
[www.adc.com](http://www.adc.com)
5. TE Connectivity (old Tyco Electronics)/AMP NetConnect

Greensboro, NC  
Tel: (800) 553 0983  
[www.ampnetconnect.com](http://www.ampnetconnect.com)

D. Racks:

1. Great Lakes Case and Cabinet  
1521 Enterprise Road  
Corry, PA 16407  
Tel: (814) 734 2436  
[www.werackyourworld.com](http://www.werackyourworld.com)
2. Hubbell Premise Wiring  
14 Lord's Hill Road  
Stonington, CT 06378  
Tel: (860) 535 8326  
[www.hubbell-premise.com](http://www.hubbell-premise.com)
3. Chatsworth Products Inc. (CPI)  
31425 Agoura Road  
Westlake Village, CA 91361  
Tel: (800) 834-4969  
[www.chatsworth.com](http://www.chatsworth.com)
4. Hoffman  
2100 Hoffman Way  
Anoka, MN 55303  
Tel: (763) 421 2240  
[www.hoffmanonline.com](http://www.hoffmanonline.com)

2.03 STATION CABLING

A. IP Voice and Data Network Station Cables:

1. Provide and install plenum rated, 4-UTP cables, to meet or exceed ANSI/EIA/TIA 568 Category 6 performance standards, UL Listed CMP. Conductors: 23 AWG solid bare copper. Conductor insulation: 100%FEP. Cable jacket: PVC.
2. Use:
  - a. Connect IP Voice work area outlets/connectors located in staff offices, rooms and at staff desks to the Technology Equipment Room (TER). Refer to the Contract Drawings for locations and configuration of the outlets.
  - b. Connect Data network work area outlets/connectors located in staff offices, rooms and at staff desks to the Technology Equipment Room

(TER). Refer to the Contract Drawings for locations and configuration of the outlets.

c. Connect Data network work area outlets/connectors located in public areas and at public desks to the Technology Equipment Room (TER). Refer to the Contract Drawings for locations and configuration of the outlets.

3. Terminations: On the outlet side, terminate the cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector using wiring scheme T568B.
4. In the Technology Equipment Room (TER), terminate cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector patch panels using T568B wiring scheme. Patch panels shall be mounted on racks. Terminate cables on patch panels in sequential order.
5. Quantity of cables shall be computed by Contractor from information provided on drawings.
6. Manufacturer: CommScope Inc. Uniprise Solutions  
Color: Blue  
Product Part No.: UltraMedia 7504  
Or approved equivalent.

B. Wireless Access Point Station Cables:

1. Provide and install plenum rated, 4-UTP cables, to meet or exceed ANSI/EIA/TIA 568 Category 6 performance standards, UL Listed CMP. Conductors: 23 AWG solid bare copper. Conductor insulation: 100%FEP. Cable jacket: PVC.
2. Use:
  - a. Connect Wireless Access Point outlets/connectors located on the first, second and third floors to the Technology Equipment Room (TER). Refer to the Contract Drawings for locations and configuration of the outlets.
3. Terminations: On the outlet side, terminate the cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector using wiring scheme T568B.
4. In the Technology Equipment Room (TER), terminate cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector patch panels using T568B wiring scheme. Patch panels shall be mounted on racks. Terminate cables on patch panels in sequential order.
5. Quantity of cables shall be computed by Contractor from information provided on drawings.

6. Manufacturer: CommScope Inc. Uniprise Solutions  
Color: Blue  
Product Part No.: UltraMedia 7504  
Or approved equivalent.

C. Wall Phone Voice Station Cables:

1. Provide and install plenum rated, 4-UTP cables, to meet or exceed ANSI/EIA/TIA 568 Category 6 performance standards, UL Listed CMP. Conductors: 23 AWG solid bare copper. Conductor insulation: 100%FEP. Cable jacket: PVC.
2. Use:
  - a. Connect IP wall phone outlets/connectors to the Technology Equipment Room (TER). Refer to the Contract Drawings for locations and configuration of the outlets.
3. Terminations: On the outlet side, terminate the cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector using wiring scheme T568B.
4. In the Technology Equipment Room (TER), terminate cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector patch panels using T568B wiring scheme. Patch panels shall be mounted on racks. Terminate cables on patch panels in sequential order.
5. Quantity of cables shall be computed by Contractor from information provided on drawings.
6. Manufacturer: CommScope Inc. Uniprise Solutions  
Color: Blue  
Product Part No.: UltraMedia 7504  
Or approved equivalent.

D. Analog Voice and Fax Station Cables:

1. Provide and install plenum rated, 4-UTP cables, to meet or exceed ANSI/EIA/TIA 568 Category 6 performance standards, UL Listed CMP. Conductors: 23 AWG solid bare copper. Conductor insulation: 100%FEP. Cable jacket: PVC.
2. Use:
  - a. Connect Analog Voice and Fax work area outlets/connectors located in staff offices, rooms and at staff desks to the Technology Equipment Room (TER). Refer to the Contract Drawings for locations and configuration of the outlets.

3. Terminations: On the outlet side, terminate the cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector using wiring scheme T568B.
4. In the Technology Equipment Room (TER), terminate cable on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector patch panels using T568B wiring scheme. Patch panels shall be mounted on racks. Terminate cables on patch panels in sequential order.
5. Quantity of cables shall be computed by Contractor from information provided on drawings.
6. Manufacturer: CommScope Inc. Uniprise Solutions  
Color: Blue  
Product Part No.: UltraMedia 7504  
Or approved equivalent.

## 2.04 BACKBONE RISER CABLING

### A. Analog Voice Tie/Backbone Cables:

1. Provide and install plenum rated, 25-pair UTP cables, to meet or exceed ANSI/EIA/TIA 568 Category 5e performance standards, UL Listed CMP. Conductors: 24 AWG solid bare copper. Conductor insulation: 100%FEP. Cable jacket: PVC.
2. Use:
  - a. Used to connect the Technology Service Entrance Room (TSER) to the Technology Equipment Room (TER) for delivery of trunk, analog voice and fax signals from the local service provider (SP) to the Library.
3. Termination In the Technology Service Entrance Room terminate the cable on ANSI/EIA/TIA 568 Category 5e compliant, type D rack mount 110-type termination block with integral cable manager and equipped with 5-pair connectors.
4. Termination: In the Technology Equipment Room (TER), terminate the cable on ANSI/EIA/TIA 568 Category 5e compliant, type D rack mounted 110-type termination block with integral cable manager and equipped with 4-pair connectors.
5. Quantity of cables shall be computed by Contractor from information provided on drawings.
6. Manufacturer: CommScope Inc. Uniprise Solutions  
Color: White  
Product Part No.: 5E25  
Or approved equivalent.

## 2.05 PATCH CORDS

A. Technology Equipment Room 4-UTP Patch Cords

1. Provide and install 4-UTP patch cords to meet or exceed ANSI/EIA/TIA 568 Category 6 performance standards, UL Listed CM. Conductors: 26 AWG stranded copper. Conductor insulation: 100%FEP. Cable jacket: lead-free, flame retardant PVC.
2. The patch cords shall be used in:
  - a. Technology Equipment Room to cross-connect data station cables to the corresponding network switches.
  - b. Technology Equipment Room to cross-connect IP voice station cables to the corresponding network switches.
  - c. Technology Equipment Room to cross-connect wireless access point data station cables to the corresponding network switches.
3. Contractor shall coordinate telephone and data electronic equipment port mapping to the station cables patch panels with the City of New York IT Department.
4. Termination: The patch cords shall be factory terminated, double ended on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connectors, wiring scheme T568B.
5. Length of patch cords: 10 feet.
6. Quantity: To be computed by the contractor from information provided on the drawings:
  - a. Provide and install (1) 4-UTP patch cord for each data station cable.
  - b. Provide and install (1) 4-UTP patch cord for each IP voice station cable.
  - c. Provide and install (1) 4-UTP patch cord for each wireless access point station cable.
7. Manufacturer: Siemon Comapny  
Color: White  
Product Part No.: MC6-10-02  
Or approved equivalent

B. Technology Equipment Room S110 to 8-pin Modular Connector 4-UTP Cable Assembly Patch Cords

1. Provide and install S110 to 8-pin Modular Connector 4-UTP cable assembly patch cords to meet or exceed ANSI/EIA/TIA 568 Category 5e performance

standards, UL Listed CM. Conductors: 26 AWG stranded copper. Conductor insulation: 100%FEP. Cable jacket: lead-free, flame retardant PVC.

2. The patch cords shall be used in:
  - a. Technology Equipment Room to cross-connect analog voice and fax station cables to the corresponding TER/TSER tie/backbone cable pairs.
3. Contractor shall coordinate the station cables patch panels port mapping to the tie/backbone cable pairs with the City of New York IT Department and the Service Provider.
4. Termination: The patch cords shall be factory terminated, one end on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connectors, wiring scheme T568B. The cable assembly shall be terminated at the other end on 4-pair S110 connecting block.
5. Length of patch cords: 10 feet.
6. Quantity: To be computed by the contractor from information provided on the drawings:
  - a. Provide and install (1) 4-UTP cable assembly patch cord for each analog voice and fax station cable.
7. Manufacturer: Siemon Comapny  
Color: White  
Product Part No.: S110P4-A4-10  
Or approved equivalent

C. Work Area 4-UTP Patch Cords

1. Provide and install 4-UTP patch cords to meet or exceed ANSI/EIA/TIA 568 Category 6 performance standards, UL Listed CM. Conductors: 24 AWG stranded copper. Conductor insulation: 100%FEP. Cable jacket: lead-free, flame retardant PVC.
2. Use:
  - a. The patch cords shall be used at the work areas to patch user equipment to the horizontal structured cabling system.
3. Termination: The patch cords shall be factory terminated, double ended on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connectors, wiring scheme T568B.
4. Length of patch cords: 15 feet.
5. Quantity:

a. Provide and install (1) 4-UTP patch cords for each station cable.

6. Manufacturer: Siemon Comapny  
Color: White  
Product Part No.: MC6-15-02  
Or approved equivalent

D. Work Area Wireless Access Points 4-UTP Patch Cords

1. Provide and install 4-UTP patch cords to meet or exceed ANSI/EIA/TIA 568 Category 6 performance standards, UL Listed CM. Conductors: 24 AWG stranded copper. Conductor insulation: 100%FEP. Cable jacket: lead-free, flame retardant PVC.
2. Use:
  - a. The patch cords shall be used at each wireless access point location to connect the network electronic access point/hub to the station cabling system.
3. Termination: The patch cords shall be factory terminated, double ended on ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connectors, wiring scheme T568B.
4. Length of patch cords: Contractor shall confirm the length of work area patch cords with the Commissioner prior to procurement.
5. Quantity: provide and install (2) 4-UTP patch cords for each wireless access point outlet location. Refer to the Contract Drawings for outlet locations.
6. Manufacturer: Siemon Comapny  
Color: White  
Product Part No.: MC6-03-02  
Or approved equivalent.

2.06 TELECOMMUNICATIONS OUTLETS

- A. Verify and confirm the color of items (faceplates, connectors, icons, etc.) specified in this Section with the Commissioner prior to purchase.
- B. Prior to submitting his/her bid and prior to commencing work, the Communications Contractor must confirm and coordinate with the Electrical Contractor the following:
  1. Locations for all communications outlets and their respective electrical back boxes.

2. Faceplates/connectors types, communications bracket types (required for communications connector installation in floor boxes), configurations and their associated electrical boxes and floor boxes.

C. IP Voice Wall Phone Outlet

1. Provide and install wall phone outlet faceplate and ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector. Faceplate accommodates one (1) insert. Attaches to standard NEMA single gang flush mounted junction box or plaster reducing ring. Color: Stainless Steel.
2. Standard Connector: Female ANSI/EIA/TIA 568 Category 6 compliant 8-pin modular connector with punch down termination. For insertion into standard single gang. Termination scheme shall be EIA/TIA T568B.
3. Faceplate shall have one (1) IP Voice/Data connector. The faceplate shall be equipped with metal studs to support a wall mount telephone station.
4. Quantity: Provide and install wall phone outlet faceplates complete with 8-pin modular connector. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
5. Manufacturer: The Siemon Company  
Faceplate Part No.: MX-WP-K6-SS  
Connector Part no.: Included  
Icon Part No.: Included  
Or approved equivalent.

D. 1-Port Analog Voice Floor Box Mount Outlet

1. Provide and install manufacturer specific communications open system modules and ANSI/EIA/TIA 568 Category 6 compliant 8-pin modular connectors. The module accommodates one (1) connector. The module attaches to a communications bracket to be installed in single gang cut-out in a type B or type D floor box. Plastic. Color: Module, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. The floor box and the associated manufacturer specific communications brackets will be provided and installed by the Electrical Contractor. The floor box is intended to be Wiremold RFB 4 gang (type B) and/or 6 gang (type D).
3. The communications contractor must coordinate with the electrical contractor the floor boxes, manufacturer specific communications brackets, manufacturer specific open systems modules, communications connectors types, configuration, quantities, etc. to ensure device compatibility.
4. Standard Connector: Female ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector with punch down termination. For insertion into floor-box manufacturer specific communications open system module. Termination scheme

shall be EIA/TIA T568B. Connector shall be un-keyed, keystone module with insertable icon and protective door for dust protection.

5. Manufacturer specific supporting communications module shall have one (1) Analog Voice rear load connector. Refer to the drawings for quantity of outlets and connector configuration in the supporting module.
6. Quantity: Provide and install outlet supporting module complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
7. Manufacturer: Legrand Wiremold  
Module Part No.: CM2 Series Open System Module CM2-U1KEYA and CM2-U2KEYA  
Blank Modules Part No.: As necessary to cover un-used communications brackets openings.  
Or approved equivalent.
8. Manufacturer: The Siemon Company  
Connector Part No.: Keystone MX6-K  
Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
Or approved equivalent.

E. 1-Port Data Floor Box Mount Outlet

1. Provide and install manufacturer specific communications open system modules and ANSI/EIA/TIA 568 Category 6 compliant 8-pin modular connectors. The module accommodates one (1) connector. The module attaches to a communications bracket to be installed in single gang cut-out in a type B or type D floor box. Plastic. Color: Module, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. The floor box and the associated manufacturer specific communications brackets will be provided and installed by the Electrical Contractor. The floor box is intended to be Wiremold RFB 4 gang (type B) and/or 6 gang (type D).
3. The communications contractor must coordinate with the electrical contractor the floor boxes, manufacturer specific communications brackets, manufacturer specific open systems modules, communications connectors types, configuration, quantities, etc. to ensure device compatibility.
4. Standard Connector: Female ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector with punch down termination. For insertion into floor-box manufacturer specific communications open system module. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, keystone module with insertable icon and protective door for dust protection

5. Manufacturer specific supporting communications module shall have one (1) Data rear load connector. Refer to the drawings for quantity of outlets and connector configuration in the supporting module.
6. Quantity: Provide and install data communications modules complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
7. Manufacturer: Legrand Wiremold  
 Module Part No.: CM2 Series Open System Module CM2-U1KEYA and CM2-U2KEYA  
 Blank Modules Part No.: As necessary to cover un-used communications brackets openings.  
 Or approved equivalent.
8. Manufacturer: The Siemon Company  
 Connector Part No.: Keystone MX6-K  
 Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
 Or approved equivalent.

F. 2-Port Data Floor Box Mount Outlet

1. Provide and install manufacturer specific communications open system modules and ANSI/EIA/TIA 568 Category 6 compliant 8-pin modular connectors. The module accommodates two (2) connectors. The module attaches to a communications bracket to be installed in single gang cut-out in a type B or type D floor box. Plastic. Color: Module, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. The floor box and the associated manufacturer specific communications brackets will be provided and installed by the Electrical Contractor. The floor box is intended to be Wiremold RFB 4 gang (type B) and/or 6 gang (type D).
3. The communications contractor must coordinate with the electrical contractor the floor boxes, manufacturer specific communications brackets, manufacturer specific open systems modules, communications connectors types, configuration, quantities, etc. to ensure device compatibility.
4. Standard Connector: Female ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector with punch down termination. For insertion into floor-box manufacturer specific communications open system module. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, keystone module with insertable icon and protective door for dust protection
5. Manufacturer specific supporting communications module shall have two (2) Data rear load connectors. Refer to the drawings for quantity of outlets and connector configuration in the supporting module.

6. Quantity: Provide and install data communications modules complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
7. Manufacturer: Legrand Wiremold  
 Module Part No.: CM2 Series Open System Module CM2-U1KEYA and CM2-U2KEYA  
 Blank Modules Part No.: As necessary to cover un-used communications brackets openings.  
 Or approved equivalent.
8. Manufacturer: The Siemon Company  
 Connector Part No.: Keystone MX6-K  
 Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
 Or approved equivalent.

G. 3-Port IP Voice/Data Floor Box Mount Outlet

1. Provide and install manufacturer specific communications open system modules and ANSI/EIA/TIA 568 Category 6 compliant 8-pin modular connectors. The module accommodates one (1) and/or two (2) connectors. The module attaches to a communications bracket to be installed in single gang cut-out in a type B or type D floor box. Plastic. Color: Module, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. The floor box and the associated manufacturer specific communications brackets will be provided and installed by the Electrical Contractor. The floor box is intended to be Wiremold RFB 4-gang (type B) and/or 6-gang (type D).
3. The communications contractor must coordinate with the electrical contractor the floor boxes, manufacturer specific communications brackets, manufacturer specific open systems modules, communications connectors types, configuration, quantities, etc. to ensure device compatibility.
4. Standard Connector: Female ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector with punch down termination. For insertion into floor-box manufacturer specific communications open system module. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, keystone module with insertable icon and protective door for dust protection
5. Manufacturer specific supporting communications modules will have one (1) Voice and two (2) Data rear load connectors. Refer to the drawings for quantity of outlets and connector configuration in the supporting module.
6. Quantity: Provide and install data communications modules complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.

7.     Manufacturer:                    Legrand Wiremold  
        Module Part No.:                CM2 Series Open System Module CM2-U1KEYA and CM2-U2KEYA  
        Blank Modules Part No.:        As necessary to cover un-used communications brackets openings.  
        Or approved equivalent.
  
8.     Manufacturer:                    The Siemon Company  
        Connector Part No.:             Keystone MX6-K  
        Icon Part No.:                  Included. Color: Voice – Yellow, Data - Blue  
        Or approved equivalent.

H.     3-Port Data Floor Box Mount Outlet

1.     Provide and install manufacturer specific communications open system modules and ANSI/EIA/TIA 568 Category 6 compliant 8-pin modular connectors. The module accommodates one (1) and/or two (2) connectors. The module attaches to a communications bracket to be installed in single gang cut-out in a type B or type D floor box. Plastic. Color: Module, connector and icon color to be coordinated with the Commissioner prior to procurement.
  
2.     The floor box and the associated manufacturer specific communications brackets will be provided and installed by the Electrical Contractor. The floor box is intended to be Wiremold RFB 4-gang (type B) and/or 6-gang (type D).
  
3.     The communications contractor must coordinate with the electrical contractor the floor boxes, manufacturer specific communications brackets, manufacturer specific open systems modules, communications connectors types, configuration, quantities, etc. to ensure device compatibility.
  
4.     Standard Connector: Female ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connector with punch down termination. For insertion into floor-box manufacturer specific communications open system module. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, keystone module with insertable icon and protective door for dust protection
  
5.     Manufacturer specific supporting communications modules will have three (3) Data rear load connectors. Refer to the drawings for quantity of outlets and connector configuration in the supporting module.
  
6.     Quantity: Provide and install data communications modules complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
  
7.     Manufacturer:                    Legrand Wiremold  
        Module Part No.:                CM2 Series Open System Module CM2-U1KEYA and CM2-U2KEYA

Blank Modules Part No.: As necessary to cover un-used communications brackets openings.  
Or approved equivalent.

8. Manufacturer: The Siemon Company  
Connector Part No.: Keystone MX6-K  
Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
Or approved equivalent.

I. 1-Port Analog Fax Wall Mount Outlet

1. Provide and install standard outlet faceplate and ANSI/EIA/TIA 568 compliant 8-pin modular connector. Faceplate accommodates one (1) insert. Attaches to standard NEMA single gang flush mounted junction box or plaster reducing ring. Plastic. Color: Faceplate, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. Standard Connector: Female ANSI/EIA/TIA 568 Cat 6 compliant 8-pin modular connector with punch down termination. For insertion into standard single gang. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, angled module with insertable icon and protective door for dust protection.
3. Faceplate shall have one (1) Analog Fax rear load connector. Refer to the drawings for quantity of outlets and connector configuration in the faceplate.
4. Quantity: Provide and install voice/data outlet faceplates complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
5. Manufacturer: The Siemon Company  
Faceplate Part No.: MX-FP-S-01-XX  
Connector Part No.: Max MX6  
Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
Or approved equivalent.

J. 3-Port IP Voice/Data Wall Mount Outlet

1. Provide and install standard outlet faceplate and ANSI/EIA/TIA 568 compliant 8-pin modular connector. Faceplate accommodates three (3) inserts. Attaches to standard NEMA single gang flush mounted junction box or plaster reducing ring. Plastic. Color: Faceplate, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. Standard Connector: Female ANSI/EIA/TIA 568 Cat 6 compliant 8-pin modular connector with punch down termination. For insertion into standard single gang. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, angled module with insertable icon and protective door for dust protection.
3. Faceplate shall have three (3) Voice/Data rear load connectors. Refer to the drawings for quantity of outlets and connector configuration in the faceplate.

4. Quantity: Provide and install voice/data outlet faceplates complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
5. Manufacturer: The Siemon Company  
Faceplate Part No.: MX-FP-S-03  
Connector Part No.: Max MX6  
Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
Or approved equivalent.

K. 2-Port Elevator Wall Mount Outlet

1. Provide and install standard outlet faceplate and ANSI/EIA/TIA 568 compliant 8-pin modular connector. Faceplate accommodates two (2) inserts. Attaches to standard NEMA single gang flush mounted junction box or plaster reducing ring. Plastic. Color: Faceplate, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. Standard Connector: Female ANSI/EIA/TIA 568 Cat 6 compliant 8-pin modular connector with punch down termination. For insertion into standard single gang. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, angled module with insertable icon and protective door for dust protection.
3. Faceplate shall have two (2) Analog Voice/IP Voice rear load connectors. Refer to the drawings for quantity of outlets and connector configuration in the faceplate.
4. Quantity: Provide and install voice/data outlet faceplates complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
5. Manufacturer: The Siemon Company  
Faceplate Part No.: MX-FP-S-03  
Connector Part No.: Max MX6  
Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
Or approved equivalent.

L. 2-Port Data Wireless Access Point Wall Mount Outlet

1. Provide and install standard outlet faceplate and ANSI/EIA/TIA 568 compliant 8-pin modular connector. Faceplate accommodates two (2) inserts. Attaches to standard NEMA single gang flush mounted junction box or plaster reducing ring. Plastic. Color: Faceplate, connector and icon color to be coordinated with the Commissioner prior to procurement.
2. Standard Connector: Female ANSI/EIA/TIA 568 Cat 6 compliant 8-pin modular connector with punch down termination. For insertion into standard single gang. Termination scheme shall be EIA/TIA T568B. Connector shall be un-keyed, angled module with insertable icon and protective door for dust protection.

3. Faceplate shall have two (2) Data rear load connectors. Refer to the drawings for quantity of outlets and connector configuration in the faceplate.
4. Quantity: Provide and install data outlet faceplates complete with 8-pin modular connectors. Quantity of outlets and connectors shall be computed by Contractor from information provided on drawings.
5. Manufacturer: The Siemon Company  
 Faceplate Part No.: MX-FP-S-02  
 Connector Part No.: Max MX6  
 Icon Part No.: Included. Color: Voice – Yellow, Data - Blue  
 Or approved equivalent.

## 2.07 TECHNOLOGY EQUIPMENT ROOM TERMINATION HARDWARE

### A. 48-Port Modular Patch Panel

1. Provide and install ANSI/EIA/TIA 568 Category 6 compliant, 8-pin 48-port modular connector, rack mountable patch panel. The panel shall be equipped with 48-port ANSI/EIA/TIA 568 Category 6 compliant, 8-pin modular connectors. Terminations shall be EIA/TIA T-568B.
2. Use:
  - a. In the Technology Equipment Room to terminate station cables. Patch panel shall be rack mountable in EIA 19 inch rack.
3. Provide and install angled strain relief cable manager in the rear of each patch panel.
4. Quantity as required.
5. Manufacturer: The Siemon Company  
 Patch Panel Part No.: HD6-48  
 Connector Part No.: Included  
 Port ID Tabs: Included  
 Paper Labels: Included  
 Rear Wire manager: WM-3A  
 Or approved equivalent.

### B. Wiring Block for Tie Backbone Cables

1. Provide and install ANSI/EIA/TIA 568 Category 5e compliant, 100-pair wiring block, rack mountable to a EIA standard 19" rack or cabinet. The wiring block shall be equipped with 4-pair connecting blocks.
2. Use:

a. In the Technology Equipment Room to terminate tie backbone cable that connects the TER room to TSER room. Wiring block shall be rack mountable in EIA standard 19 inch rack.

3. Quantity as required.

4. Manufacturer: The Siemon Company  
Wiring Block Part No.: S110DB1-100RFT  
4-Pair Connector Part No.: Included  
Horizontal Wire manager: Included  
Paper Labels: S110-HLDR, S110-LBL, S110-SHT  
Or approved equivalent.

## 2.08 TECHNOLOGY SERVICE ENTRANCE ROOM TERMINATION HARDWARE

### A. Wiring Block for Tie Backbone Cables

1. Provide and install ANSI/EIA/TIA 568 Category 5e compliant, 100-pair wiring block, rack mountable to EIA standard 19" rack or cabinet. The wiring block shall be equipped with 5-pair connecting blocks.

2. Use:

a. In the Technology Service Entrance Room to terminate tie backbone cable from Technology Equipment Room. Wiring block shall rack mountable in EIA standard 19 inch rack.

3. Quantity as required.

4. Manufacturer: The Siemon Company  
Wiring Block Part No.: S110DA1-100RFT  
5-Pair Connector Part No.: Included  
Horizontal Wire Manager: Included  
Paper Labels: S110-HLDR, S110-LBL, S110-SHT  
Or approved equivalent.

## 2.09 TECHNOLOGY EQUIPMENT ROOM RACKS

### A. 4-Post Racks

1. 20.75" (W) x 24" (D) x 48.5" (H), 26RU wall mount, 4-post frame, steel construction with EIA-compliant mounting holes, black finish.

2. Use:

a. Used to support the tie backbone and station cables termination hardware and network equipment in the Technology Equipment Room, as shown on drawings.

3. Quantity:

- a. Provide and install (2) 4-post wall mount racks/frames in the Technology Equipment Room.
  - b. Provide and install (2) grounding kit for 4-post wall mount racks/frames in the Technology Equipment Room.
4. Manufacturer: Great Lakes  
Color: Black  
Rack Part No.: GL48SRD  
Or approved equivalent.

Note: Communications Contractor shall ground each rack to the Telecom Main Grounding Busbar located in the same room.

## 2.10 TECHNOLOGY SERVICE ENTRANCE ROOM RACKS

### A. 4-Post Racks

1. 20.75" (W) x 24" (D) x 48.5" (H), 26RU wall mount, 4-post frame, steel construction with EIA-compliant mounting holes, black finish.
2. Use:
  - a. Used to support the tie backbone cable termination hardware in the Technology Service Entrance Room, as shown on drawings.
3. Quantity:
  - a. Provide and install (1) 4-post wall mount rack.
  - b. Provide and install (1) grounding kit for 4-post wall mount rack.
4. Manufacturer: Great Lakes  
Color: Black  
Rack Part No.: GL48SRD  
Or approved equivalent.

Note: Communications Contractor shall ground each rack to the Telecom Grounding Busbar located in the same room.

## 2.11 CABLE MANAGEMENT/SUPPORT HARDWARE

### A. 2RU Horizontal Wire Manager

1. Provide and install 2RU rack mounted horizontal wire manager units for routing of station cables patch cords.
2. Use:

a. In the Technology Equipment Room to support station cables patch cords in the 4-post wall mount rack/frame, as shown on drawings.

3. Quantity as needed.

4. Manufacturer: The Siemon Company  
Product Part No.: RS3-RWM  
Or approved equivalent.

## 2.12 LABELS

A. Communications Contractor to confirm all labeling schemes with the City of New York prior to commencing work.

### B. Cable Labels

1. Provide and install self-adhesive, self-laminating, with clear plastic shield. Pin feed for machine printing. Used for horizontal Voice/Data cable identification. Labels shall be provided on both ends of all cables

2. 1"(L) for station cables, 2"(L) for tie backbone cable, 1/4" (H) tag with 1/8" (H) light Blue letter on White background.

3. Length as required.

4. Manufacturer: The Siemon Company  
Product Part No.:  
Or approved equivalent.

### C. Faceplate Labels

1. Provide and install white polyester, laser printable labels for use on the faceplates. 1" x 3/8".

2. Manufacturer: The Siemon Company  
Product Part No.:  
Or approved equivalent.

### D. 8-Pin Modular Connector Patch Panel Labels

1. Provide and install white polyester, laser printable labels for use on modular connector patch panels, 3/4" x 1/4", 1" x 1/2".

2. Manufacturer: The Siemon Company  
Product Part No.:  
Or approved equivalent.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Follow manufacturers' instructions for installing Communications Cabling system. Where instructions are unavailable, follow approved industry practice.
- B. Examine and compare the communications drawings and specifications with the drawings and specifications of other trades, report any discrepancies to the Commissioner and obtain written instructions for changes necessary in the work. Include most stringent requirements in the bid.
- C. Repairs or changes caused by the Contractor's neglect shall be made at the contractor's expense. Protect the finished work of other trades from damage or defacement and remedy any damages as required.
- D. Clean up debris generated by installation activities and discard as directed by the Commissioner.

### 3.02 EQUIPMENT INSTALLATION

- A. Install and coordinate the telecommunications outlets work in cooperation with other trades installing interrelated work. Before installation, make proper provisions to avoid interferences in a manner accepted by the Commissioner.
- B. The locations of telecommunications outlets and other equipment indicated on the drawings are approximately correct and are understood to be subject to such revision as may be found necessary or desirable at the time the work is installed.

### 3.03 CONDUIT AND BOXES

- A. Division 26 shall provide conduit, wall boxes, floor boxes and their associated communications brackets, and required hardware, except as indicated on the drawings. The contractor shall be responsible for any additional conduit or boxes required for a quality installation.

### 3.04 CABLE INSTALLATION

- A. Furnish and install the Communications Cabling system per the Contract Documents and per manufacturer's recommendations.
- B. Install station cables as an uninterrupted conductor section from the corresponding outlets to the Technology Equipment Room as indicated on the drawings, without splices or mechanical couplers between the points of origin and termination.
- C. The Contractor shall support horizontal cable bundles on the cable tray to be furnished and installed under the Communications Pathways work. No non-re-enterable tie wraps shall be used to secure cables to the trays.
- D. Where horizontal cables exit trays to run to workstation locations, the Contractor shall furnish and install J-hooks with the appropriate mounting hardware span of a maximum of 5-feet for open cable runs. J-hooks shall not be fastened to the suspended ceiling support structures, electrical or plumbing piping or any other trade work.

- E. Unless otherwise noted, route all cables above the finished ceilings or below raised floors, transitioning vertically to wall mounted back boxes via conduit stub-ups into the ceiling void or to floor boxes, as required.
- F. Wiring not in conduit or cable trays shall be run concealed below the raised floor and above the finished ceiling.
- G. Cabling shall not be fastened to the work of others.
- H. Terminate 4-pair UTP horizontal cables on Category 6 jacks. The pinning configuration of the outlet jacks shall be T568B unless otherwise specified by the Commissioner prior to installation. The jacks shall be inserted into the appropriate faceplates for flush wall mounted receptacles and/or floor boxes.
- I. Provide all other outlet configurations in accordance with the drawings.
- J. Label each outlet and each cable with an appropriate ID number.

### 3.05 CABLE DISTRIBUTION

- A. Follow room boundaries when pulling cables through ceilings for distribution into the walls, conduits, wiring channels, outlets, etc.
- B. Cable distribution from the TER to work locations (except as noted) shall be run in the raised floor voids as shown on the drawings.
- C. Cable shall be loose bundled into the cable supports. Use only the approved re-enterable cable ties to secure cables in the overhead distribution.

### 3.06 CABLE SLACK

- A. Provide a minimum of 9 inches of slack at each terminal box or behind each faceplate after jack installation is completed to allow for easy dismounting and extension of outlet covers and wire terminations.
- B. Provide a minimum of 2-feet slack in a loop for UTP at the head of each stub-up or distribution conduit.

### 3.07 FIRE STOPPING

- A. Seal penetrations through fire rated walls, floors and walls created by or made on behalf of the contractor so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the National Electric Code.
- B. Use sealant material that has passed fire exposure testing in accordance with standard time-temperature curve in the standard UL ASTM E 119 and NFPA 251 and the hose stream test in accordance with UL 10B.

- C. Provide removable fire-stopping pillows in an approved fashion in openings greater than 4" diameter, or 4"x4" square cross section. Provide wire mesh grate over bags as recommended by the manufacturer subsequent to installation.

### 3.08 EMI/RFI AVOIDANCE

- A. To avoid electromagnetic interference (EMI) route cables to maintain the following minimum distances:
  - 1. Twelve (12) inches from high voltage lighting.
  - 2. Thirty-six (36) inches from power lines of 5 KVA or greater.
  - 3. Forty (40) inches from transformers or motors.
- B. Maintain minimum twelve-inch separation between telecommunication cables running exposed in the ceiling or floor voids and parallel electrical cables/conduits.
- C. Telecommunication cables shall cross the electrical cables/conduits only at 90 degree angles.

### 3.09 CABLE IDENTIFICATION SYSTEM

- A. User color coding in accordance with EIA-606B standards.
- B. Jacks, faceplates and wall outlets at the user locations, termination blocks, and individual station cables, shall be labeled with (at minimum) machine generated black uppercase lettering on a permanent adhesive label stock, covered with a permanent water resistant sealer. Contractor shall use labeling stock and/or lettering that provides a high contrast with the color of the terminating equipment, faceplate or cable.
- C. Place labels on both ends of the cable at least 4 inches from point at which the cable is terminated on the connector or terminal block.
- D. Provide permanent, machine generated cable tags. Temporary tags are acceptable only during construction. Label each tag with the appropriate cable number as determined on the cable pull schedules.
- E. Cable identification numbers in the pull schedules shall be presented in an abbreviated format. All cables ID's shall (at minimum) indicate the floor, originating cost ID, and the sequential cable number shown on drawings.
- F. If at any time during the job the permanent cable tag becomes illegible or is defaced or removed, immediately replace it with a duplicate pre-printed cable tag.

### 3.10 PANEL IDENTIFICATION

- A. Furnish a nameplate for each patch panel, cross-connected field, equipment rack, etc. Unless otherwise noted, use a permanent adhesive label stock, covered with a permanent water-resistant sealer.

### 3.11 TERMINATING BLOCKS, DISTRIBUTION RACKS AND PATCH PANELS

- A. Locate and place terminating and distribution hardware as shown on the drawings.
- B. Assemble and install equipment per manufacturers' printed instructions.
- C. Terminate horizontal station cables directly on rack mount 8-pin modular patch panels.

### 3.12 CABLE PULLING

- A. Do not exceed a pulling tension of 25 lbs. on 4-pair UTP cables.

### 3.13 TECHNOLOGY ROOMS

- A. Provide cable supports in the Technology Rooms, as indicated on the drawings. Cable dressed onto the supports shall be secured using removable Velcro-type re-enterable straps only.
- B. Cables, after entry into the telecommunications rooms must be secured to cable trays, backboards, etc. and dressed into supports. The Contractor shall attach the cables where required to plywood backboards using D rings at a spacing of approximately 12 inches.
- C. Support cables mounted onto patch panels with strain management bars on the rear of the rack.
- D. Route cables from work locations into the equipment rooms via overhead distribution. Maintain overhead distribution wherever possible within the equipment rooms.

### 3.14 CABLE TESTING

- A. Test cables installed under the contract.
- B. Pre-installation Inspection:
  - 1. Visually inspect cables, cable reels and shipping cartons for shipping damage. Return visibly damaged items to the manufacturer.
  - 2. Prior to testing, submit for review and approval copies of test report forms proposed for use. Forms shall, at minimum, contain: Project Name; Contractor's Name; Date of Test; Media Type and Description; Make, Model and Serial Number of the test equipment and date of last calibration.
- C. Post-Installation Testing
  - 1. Test only completed systems. Partial or statistically sampled testing is not acceptable, except by prior, written approval from the Commissioner.
  - 2. Paired and multi-conductor metallic cables: Perform an end-to-end test for continuity, ground fault, shorts and crossed pairs for each cable pair/conductor:

- a. Test cable pairs from the work area outlet, through all conductors, patches and cross connects to the equipment room.
  - b. Test horizontal cable pairs not cross-connected to the backbone from their furthest termination point to the work area outlet.
3. 4-pair Category 6 UTP (In addition to end-to-end tests listed above):
- a. Test for length, capacitance, attenuation, noise, resistance, NEXT, FEXT, ELFEXT, PSNEXT, PSELFEXT and delay skew with injected standard signals. Utilizing automated test equipment, set up and measure a basic link to determine the actual swept frequency ACR. Compare the ACR to the ISO/IEC Cat 6/Class E ACR at 250 MHz. Test bi-directionally in accordance with ANSI/TIA/EIA-568C.
  - b. Test cabling not cross-connected or patched within the closet as a permanent link.
4. For 4-pair and 25-pair cables replace the entire cable if a bad pair or conductor is found.
  5. Remove defective cables from cable pathways. Do not abandon cables in place.
  6. The Commissioner reserves the right to observe the conduct of any or all portions of the testing process and to conduct, and to require the Contractor, using the Contractor's equipment and labor, a random re-test of up to five (5) percent of the cable plant to confirm documented test results.
  7. Document test results and corrective procedures and submit to the Commissioner within ten (10) working days of test completion.
  8. In addition to the actions specified above, the contractor may be required to be present while the City of New York designated representatives conduct performance tests of the transport electronics connected to the cabling system.

D. Test Equipment

1. Metallic Cable Pair Tester: Fluke DTX CableAnalyzer, Independent Technologies TEST-ALL IV or 25, Siemon Company Multi-Test MT-5000, or equivalent.
2. 4-pair UTP Automated Cable Tester: Tester shall be compliant with ANSI/TIA/EIA-568C. Provide bi-directional testing and test to Level III standards and beyond for Category 6 permanent link and channel.

3.15 STAFFING

- A. Designate a qualified foreman. The foreman shall be present in the field at all times during the performance of the work.

- B. Provide a supervisory workforce sufficient to maintain efficient performance of the Contractor's responsibilities.
- C. Use only skilled and reliable workforce and discontinue the services of anyone employed on this project upon written request by the Commissioner.
- D. Use personnel who is qualified (at minimum) to perform all of the installation and testing work activities required under the contract.
- E. Provide and use the proper tools in good working order for the performance of the work. The Commissioner reserves the right to review the tools and tool maintenance procedures of the contractor and require replacements to be obtained.
- F. Telephone and data industry cable installation standards, TIA/EIA and BICSI standards, and manufacturers' instructions shall be used for in-process quality control and final acceptance of the work.

### 3.16 RECORD DRAWINGS

- A. During construction, the Contractor shall keep an accurate record of all deviations between the work as shown on the drawings and of work actually installed.
- B. Provide the City of New York with two (2) sets of installation diagrams, parts lists, shop drawings and manufacturers' information on all equipment and cables provided by the Contractor. Submit information to the City of New York not more than one week after project completion.
- C. Upon completion of work and acceptance by the City of New York, provide as-built drawings of the complete system including, but not limited to, floor plans showing the exact location and type of each cable tray segment, cable ladder configuration, outlet location, poke-through fitting, etc.
- D. As-built drawings shall indicate a unique ID number for conduits/sleeves and other major pathway components provided. ID number shall include the floor the item occurs on.
- E. Submit cable pull schedules for cables installed in this contract.
- F. Submit a schedule of all conduit sleeve/pathway ID numbers.

### 3.17 ACCEPTANCE

- A. Once the testing has been completed, as-built and testing documentation delivered to the City of New York, and the Commissioner is satisfied that all work is in accordance with the contract documents, the Commissioner shall notify the contractor in writing of the acceptance of the work performed. The date of this acceptance shall constitute the commencement of the warranty period.

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## SECTION 281000

### SECURITY SYSTEM

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. All work of this Section shall comply with the requirements of the Conditions of Contract (including: Bidding requirements, Contract forms, Conditions of Contract and Standard forms), with all Specification Sections of Division 1 - General Requirements, with the Drawings, and with all other Contract Documents.
- B. Special attention is called to applicable Divisions 1, 2, 6, 8, 9, 21, **22, 23, 26** and 27 for installation coordination.

##### 1.2 WORK INCLUDED

- A. This contractor to interconnect the new Software House PC based intrusion detection system/card access system (IDS/CA), its database, and CCTV system to provide an integrated system.
- B. NYPL's existing contractor shall connect the NYPL-BL Software House IDS/CA system with the Central Research Library (CRL - located at 5th Avenue and 42nd Street) existing Software House System. NYPL's existing contractor shall be required to interface the new operator terminals, printers, Software House field multiplex panels (APC's) and DVR's with the existing Software House equipment in the CRL building.
- C. Furnish office, field, factory, manufacturers' representatives, and contractors' shop engineering, supervision, labor, materials and methods required to provide the complete Security System work, in first class condition, as indicated on the Drawings and specified herein, including all devices, conduit, wiring, and connection to 120 VAC sources provided elsewhere in Division 26.
- B. Prepare Shop Drawings for all system components and submit for approval prior to device ordering. See Article L, this Section, for mandatory manufacturer's participation.
- C. Provide samples of equipment and cables proposed for installation to expedite equipment approvals, assure architectural design compatibility, and equipment compatibility with the Security System.
- D. Verify all dimensions and conditions at job site.
- E. Provide templates or special instructions of installation requirements to applicable trades, including but not limited to, Architectural Woodwork, Hollow Metal and Wood Doors and Frames, Misc. Metals and Architectural Metals Contractor, Hardware Supplier and Electrical Contractor.

- F. Supply, install, make operative, and test, the system and its components in accordance with applicable codes, local authorities having jurisdiction, manufacturers' recommended practices, industry standards, the Commissioner, the City of New York, the existing New York Public Library – Central Research Library (CRL) security system maintenance and service contractor or their representatives, these Specifications, and the Drawings.
- G. Make final adjustments, calibrations and programming modifications as directed by the authority having jurisdiction, the Commissioner, the City of New York, the existing New York Public Library – Central Research Library (CRL) security system maintenance and service contractor or their representatives, these Specifications, and the Drawings.
- H. Furnish documentation, including approved Shop Drawings, product data, test reports, programming sequences, database input, operators, maintenance and installation manuals, and As-Built Drawings, in final "Project Manuals", for the City of New York's use.
- I. Provide instruction and training for the City of New York's operating and maintenance personnel.
- J. Warrant all new equipment, wiring, and components for a period of one year from accepted written date of turnover.
- K. Maintain and service the new equipment for a period of one year from the written accepted date of turnover.
- L. Provide complete manufacturer/factory assisted system design, specification, installation instructions and sizing of all system equipment and insure proper annunciation and operation, programming configuration and cabling requirements to ascertain that all specified functions will be provided and all devices shown will be integrated into the new CRL security system, and supported by the manufacturers and/or their licensed representatives for guarantee and warranty services.
- M. Produce, update, and submit to the Commissioner or his designated representatives, in accordance with the General Conditions, all shop drawing logs, work schedules, submittal status, delivery dates, purchase schedules, outstanding RFI's, and contract change orders.
- N. Coordinate with Commissioner, any State Inspection Service Departments and Electrical Department, the required mounting heights for all card readers and keypads and intercoms and confirm locations as shown on the Drawings comply with current ADA standards.
- O. Program the Intrusion Detection System/Card Access System (IDS/CA), CCTV system, and load with user/City Of New York defined database requirements and specified operations contained herein, and as required to achieve connectivity with the CRL site.
- P. Provide all necessary text and graphic database preparation and loading to incorporate all devices, create all Intrusion Detection System/Card Access cards and integrate all systems, as required by the City of New York, for both the BL (Branch Library) and CRL sites.
- Q. Provide all necessary programming to integrate the Software House head-end (Donnell Library) with the NYPL-BL.

- R. Coordinate with the NYPL information technologies department and telecommunications contractor for NYPL-Software House head-end/BL WAN interconnect and provide required converters, terminal servers, and hubs.

### 1.3 RELATED WORK SPECIFIED IN OTHER CONTRACTS

- A. See Division 26 of the contract documents for all specifications governing the performance of work associated with the installation of raceway (conduit, EMT, cable trays, wire mold, trough, etc.), system junction and pull boxes, and device rough-in boxes, for all Security System work shown on the Security Drawings. Conduit, back box and trough work shall be provided by this contractor.
- B. See Division 26 of the contract documents for all work related to supplying 120/220 VAC power for hook-up to any security system equipment requiring it.
- C. See Division 9 of the contract documents, Finishes, for details relating to acoustical ceilings and gypsum board systems, floor finishes, painting, etc., for information pertinent to device and back box selection and installation.
- D. See Division 8 of the contract documents, Doors and Windows, for all associated details of doors and frames, and windows and frames, as pertinent to selection of magnetic contact device type, placement and mounting in frames and doors and associated back boxes, wiring pull and/or junction boxes.
- E. See Division 8 of the contract documents, finish Hardware for details relating to door/ frame hardware and preparation, electrified locks, power transfer devices, lock power supplies, door lock/unlock control panels and required coordination to accommodate these components and/or systems, lock voltage and current draw coordination with lock power wire gauge interface and integration with ADA power operated doors, and any other related equipment and/or requirements.
- F. See Division 26 of the contract documents for information relating to the fire alarm system and, as required, relay interface to interrupt power to electric locked doors, so that they may be remotely released.
- G. See Division 6, rough finish carpentry, and coordinate size and location of plywood backboards at SDF locations to accommodate mounting of all required security panels, trough, etc.
- H. See Division 6, wood and plastics for coordination of security equipment placement at all reception desks, administrative office areas, and installation details for mounting, service and wiring.
- I. Review all other specification sections, as required, to achieve complete inter-trade coordination.

J. Coordination with Electrical Contractor

1. This contractor is required to coordinate with other trades regarding the 28100 Security System. The bidders must confirm with the applicable trade, what is actually being provided.
  - a. All cable shall be run in 100% conduit; conduit shall be a minimum of  $\frac{3}{4}$ " between field device and the applicable equipment and/or security/voice/data closets.
  - b. Provide all related building preparation, including, but not limited to: backboxes, plaster rings, floor boxes, poke through devices, pathways, 120/220VAC power, 120/220VAC power connection to security equipment, cableways, cable protection, surface mounted metal raceway, surface raceways, conduits with bushings, conduit stubs with bushings, sleeves with bushings. Pull strings, bonding, grounding, core drilling, cutting, patching, and cover and finish plates.
  - c. Provide all fireproofing of penetration and openings, environmental seals, smoke and fire stopping seals, including all conduits, sleeves, slots etc. where cables pass from one location to another.
  - d. Provide seismic supports, supplementary steel and channels, etc., for a completely functional system.
  - e. The Electrical Contractor shall install all specialized/custom back boxes furnished by the security contractor.
  - f. The subcontract between the General Contractor and the Electrical Contractor shall contain a provision whereby the Electrical Contractor shall have the obligation to coordinate its security system work with the Security Contractors for this section.
  - g. Removal and re-installation of new and/or existing ceiling tiles as required.
  - h. Section 28100: The Electrical Contractor shall review section 28100 documents in their entirety and shall provide any additional requirements of the Electrical Contractor as detailed in Section 28100.
2. Security Contractor responsibilities unless otherwise noted.
  - a. The Security Contractor shall be responsible for: providing, installing, terminating, troubleshooting, and warranty service of all cabling, conduit, terminal equipment, and head-end equipment specified in this section for a completely operational system.

- b. The Security Contractor shall furnish all specialized/custom backboxes to the Electrical Contractor for installation.
- c. Security Contractor shall keep fully informed as to the shape, size, and position of all openings required for all apparatus, and give the Electrical Contractor information in advance to build openings into the work.
- d. Coordinate exact locations and roughing in dimensions of all work and equipment before installation and make all final connections as required. Any changes required to avoid interferences or to provide adequate clearances for Code and maintenance requirements shall be made at no additional cost.
- e. Work that is installed before coordination with other trades, or that causes interference with the work of other trades, shall be changed to correct condition.
- f. Obtain a complete set of Project Drawings and Specifications for coordination and to determine the full scope of work.
- g. Attend project coordination meetings to coordinate work of this Section, work of other trades, and project and phasing requirements.
- h. The Security Contractor shall be responsible for: removal and re-installation of ceiling tiles as required to install cabling.

#### 1.4 SUBMITTALS

##### A. Technical Proposals

1. All responding contractors must submit with this bid a detailed response to the requirements of the Contract Documents. This response shall constitute a description of methods, procedures and specific equipment the Contractor proposes to provide in order to achieve conformity with the Specifications, and compatibility with the designed building configuration.
2. The document shall indicate compliance with existing site conditions, equipment standards, maintenance and service standards, and compatibility with all proposed and existing Software House head-end (Donnell Library) security systems equipment and software.
3. The technical proposal shall indicate compliance with site conditions, equipment standards, maintenance and service standards, and compatibility with all proposed security operations and equipment. Note the requirement to interconnect the Intrusion Detection, the card Access Control System (and its database) and the CCTV system to provide an integrated system of detection, monitoring, reporting and assessment.
4. This Technical Proposal shall contain a complete description of operating functions and integration of required portions of the systems and any proposed alternative

configurations, by the system equipment manufacturers and/or the Security System Contractor.

5. Manufacturers' or vendors' catalogue "cuts" and technical information of all system equipment and all cables as proposed shall be included and identified in descriptive text of Proposal as to application in system.
6. As part of the Technical Proposal, the prospective Contractor shall give written notice of any materials or apparatus believed by the Contractor or manufacturers or their representatives to be inadequate or unsuitable, in violation of laws, codes, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted to provide system functions as specified or required herein.
7. Complete information as specified must be provided, which documents a clear understanding of the systems as designed, which clearly allows an evaluation of this understanding, and which completely describes all system components and their integration into operating systems, as well as manufacturer's agreement on equipment compliance with specified functions and security system drawing layout, and integration into said system.
8. The Technical Proposal shall not be acceptable as a substitution for any portion of the Shop Drawing submission process.

B. Submittal Format

1. Submittals shall be electronically submitted as follows:
  - a. All 8 ½" X 11" to 11' X 17" information shall be submitted in color PDF format.
  - b. All information larger than 11" X 17" shall be submitted in PDF or AutoCAD format.
    - 1) Hard copies of this larger format information shall also be submitted with electronic copies.
2. Provide a Submittal Bill of Materials Index/Equipment List, with column headings that clearly identify the information requested herein for each and every item submitted.
  - a. Each and every specification sheet submitted shall include a page number in the lower outside corner of the sheet. Double-sided specification sheets shall be identified by two (2) separate page numbers.
  - b. On each and every specification sheet submitted, indicate the applicable part numbers (s) on the sheet (s) by one of the following methods:

- 1) Circling the applicable part number(s)
  - 2) Putting an arrow next to the applicable part number(s)
  3. The Submittal Bill of Materials Index/Equipment List column headings shall identify the following minimum information. Submittals must be submitted using the following "headings" in the order indicated from left-to-right on the Bill of Materials Index/Equipment List:
    - a. All Bill of Material items shall be listed in the Bill of Material Index/Equipment List, in the same order as they appear in the specification, starting from the beginning of the specification.
      - 1) Provide reviewing authority with an electronic file/copy of the Bill of Material Index/Equipment List.
    - b. "Specification Paragraph #", reference specification paragraph/line number/location, that identifies each individual item, for every item specified and submitted.
      - 1) Example of paragraph/line number/location: 2.13, B., 7., c., 4), e) Power Supply
    - c. "Description" of each item
    - d. Manufacturer's "Name" for each item
    - e. Manufacturer's "Model #" for each item
    - f. "Quantity" of each item being provided for reference use.
    - g. Submittal Page Number(s) of specification sheet(s) for each item
  4. Any submittal that does not include a submittal Bill of Materials, and provides a minimum of the information requested herein, shall be rejected without further review and returned to the applicable parties.
  5. When this Security Contractor is responding to submittal review comments by the reviewing authority, provide an additional copy of the Contractor's written responses electronically in MS Word Format, and forward to the reviewing authority.
- C. If proposed equipment deviates from the Specifications or Drawings, indicate in writing on Company letterhead those differences and provide sufficient data to justify acceptance.

Failure to indicate deviations or substitutions implies full compliance with drawings and specifications.

D. Shop Drawings And Cut Sheets

1. Shop Drawings for all equipment, floor plan areas and coordination issues, as called for in this Section, shall be required to be submitted to the Construction Manager.
2. It is the intent for the security system contractor to prepare and submit, as a single submittal, complete equipment and cabling shop drawings, and coordinated conduit and wiring drawing package.
3. Partial submittals of cable, conduit drawings, and equipment/components, cuts, WILL NOT be reviewed. They will be returned "Rejected" for non-compliance with the submittal requirements of the contract documents.
4. Shop drawings shall specifically address and identify all aspects of the connectivity between Software House products at the NYPL-BL and CRL sites and indicate the means utilized to support all BL site functions with either existing and/or new CRL Software House equipment. These drawings shall be reviewed by the existing CRL site Software House system integrator.
5. The Drawings and Specifications are intended to supplement each other so that any details or equipment shown on the Drawings and not mentioned in the Specifications or vice versa shall be executed the same as if mentioned in the Specifications and shown on the Drawings. Shop Drawings shall reflect this coordination of Drawings and Specifications.
6. All Shop Drawings submitted shall be checked by the Contractor for all clearances and field conditions, including, but not limited to, plumbing piping, HVAC and related equipment, architectural finishes, access door locations, light locations, millwork construction, electrical connection, distribution and equipment, HVAC duct and register sizing and locations, glazing details, door and frame details, rolling grille details, misc./louvers/grilles, etc., as required to insure shop drawings reflect "to be installed" coordination.
7. Shop Drawings shall be created by the Contractor, manufacturer or manufacturer's designated representative. If created by the Contractor, they shall be submitted to and be reviewed by the manufacturer or their designated representative and include a statement on the Drawings that this process has occurred and that the Shop Drawing reflects the approval of the configuration to work in accordance with these specifications and manufacturer's standards. Manufacturer's installation instructions shall be submitted for each piece of equipment and/or system.
8. The Contractor shall submit, for approval, in accordance with General and Supplementary General Conditions, Shop Drawings, Cuts Package and Samples of the equipment being provided which shall include, but not be limited to, the following:

- a. Magnetic contact switches, all types as required, showing mounting installation detail for all door, hatch and rolling door and grille types in this project, dimensioned door and frame preparation (template) requirements, conduit and box system, end-of-line resistor and wire terminations, and interconnect to intrusion detection panels, alarm point monitoring field multiplex panels (remote input modules) and/or card access multiplex panels.
- b. Duress button device, complete with mounting template, conduit, signal and power wiring details, end of line resistor value and placement, LED reset mechanism, back box and/or junction box arrangement and connection to intrusion detection panel and/or remote alarm point monitoring field multiplex panels and/or remote input modules.
- c. Electrified door hardware, REX contacts and door lock/unlock panels, complete with specifications on device operation, (hardware manufacturer verified), conduit and wiring, and junction box connection details, back EMF/Surge suppressor device placement, and connection to access control field multiplex panel. Obtain these exit-wiring diagrams from and include details of coordination with the project's Division 8 hardware supplier.
- d. Low voltage power supplies and transformers, for intrusion detection security devices, CCTV cameras, CCTV domes, intercom voice communication system, stand alone and card reader access controlled locks (obtain from Division 8 hardware supplier), complete with load calculations, circuit wiring, battery back-up calculations, and supervisory monitoring circuit connections to the intrusion detection panel, loss of AC and low battery alarm inputs to alarm point monitoring panel, etc.
- e. Complete information on voice intercom system, including door station and master station fabrication materials, size, weight, mounting, back box requirements, system interconnect wiring, weather resistance and color and graphic text selection on station selection switches. Provide information on interconnect to 120VAC circuits. Provide special statement of outdoor weather resistance.
- f. Complete information on remote (field located) card reader access control devices, including card reader and cards, request-to-exit devices and back boxes, wiring requirements, power loss and any required fire alarm release interface/functions, interface to ADA power operated door controls, etc. Obtain electric lock, power supply and door lock/unlock control release button wiring diagrams, and power transfer hinge and/or knuckle information and ADA power operated door control schematics from Division 8 Hardware Supplier. Assure proper installation techniques, voltage requirements, power supply sizing, back EMF protection, sequence of operation and fire system's interface from Division 26 and fire alarm equipment supplier, etc.
- g. Complete information on intrusion detection system alarm point monitoring remote input modules and access control field multiplex panels, complete with any required alarm input, zone or card reader expander modules, output relay modules, as well as premises functions, IDS output relay alarm input points, E.O.L. resistor requirements and values, power requirements, alarm signal input and output relay programming matrix and terminations, specific alarm output relay connections for access control system functions, service

requirements, conduit and wire entry locations, cable type requirements, grounding, shield terminations required, IDS communications/power bus interface, heat generation, battery back-up, loss of AC and low battery monitoring, etc. Provide factory wiring diagrams for all panel boards, expansion boards/modules, relay boards/modules, communication boards with wiring connections shown specific to this project, etc.

- h. Complete access control system's applications software description, database programming description, describing all specified and provided system capabilities for this project, indicating use of system software programming features, utilizing card access transactions programming on a reader-by-reader basis, in matrix format, etc. Also, complete operating system hardware platform and network requirements, event and history printer information and system hardware, software information and how they are integrated into the access control system network. Also, provide a special statement of communications compatibility between the access control system software and the CCTV system matrix front end.
- i. Complete CCTV system with all required software, cameras, lenses, housings, poles, mounting supports and fastening, video, control, signal and power wiring, monitors, digital video recording equipment, power supplies, 120 VAC surge suppressors, connection to card access system PC and intrusion detection system output relay modules, etc. Include each piece of equipment, system interconnect drawings, in both Riser format and card access and intrusion detection system interface schematic, and point to point wiring diagrams at all points of component interconnect.
- j. Connection to door locking/unlocking electrified door control panels including power supply, access control system interface, remote electrified door locks, system cable requirements, point to point wiring diagrams, a complete text sequence of operations, installation, test and set-up instructions, connection to card access system field multiplex panel, etc. Provide mounting drawing elevation and lobby desk millwork locations to identify integration and coordination requirements. Also, show back box and conduit details.
- k. 120/220 VAC Line conditioning, lightning and surge suppression and UPS equipment, complete with load side capacity calculations, load side power connection diagrams, line side connection, disconnect means, regulation and filtration criteria, alarm output to intrusion detection system, etc.
- l. All video surveillance, access control and related system signal, data/communication, control and power cables.
- m. Shop drawings, including all security system's equipment locations, complete with equipment, and 120/220 VAC requirements.
- n. Grouped locations of security equipment panels, infrastructure networking devices and power supply locations, hereinafter referred to as Security Distribution Frames (SDF's), including equipment, conduit, trough and NEMA enclosures arrangement, access control system field multiplex panels and intrusion detection panels, device power supplies, and/or transformers, as

well as power supplies for all other related system equipment, CCTV power supplies, electric lock power supplies, etc.

- o. Also, 120/220 VAC and associated surge suppression, enclosure tampering, as well as wiring, grounding, shield terminations, conduit and wire entry schemes. Also, SDF to SDF and SDF to lobby/ reception/security desk interconnects, showing power connections, conduit and wire configuration and internal equipment mounting and wiring.
  - p. Conduit and wire routing drawings of all work in ceilings, walls and floors.
  - q. All rack, console, and related security device mounting and housing equipment.
  - r. Any other component of system as specified herein or as called for in the Drawings, or as required to achieve specified system operation.
  - s. Provide large-scale drawings (1/2" = 1'-0") of all primary security equipment locations including SDF closets.
9. Shop Drawings shall be reviewed and pre-approved by system and equipment manufacturer's engineering department for complete system including all wiring, devices, power requirements, agency listings, manufacturers' ratings, environmental operating criteria, and operating performance characteristics, prior to submission to Commissioner. Shop Drawings shall be stamped by factory engineer indicating approval of submitted configuration with Contract Drawings, and will not be reviewed without factory stamp or approval letter.
10. All Shop Drawings and samples shall be returned to the Contractor for corrections and additional information and shall be resubmitted, properly corrected, and with required supplemental information.
11. Drawings shall contain all corrections made by the Engineer, or the manufacturer's engineering department, prior to, or as part of, approval process, and shall satisfy all requirements of the Specifications.
12. Shop Drawings and Cut Sheets that have to be re-submitted shall be re-submitted under the following criteria:
- a. The shop drawing and cut sheet documents shall be resubmitted with a copy of the engineer's original review report. The resubmission will respond in writing to each item of the engineer's original review report, specifying what has been done to update, change, and/or rectify the original comment.
  - b. The shop drawing and cut sheet documents shall be resubmitted as a whole package, NOT AS A PARTIAL SUBMITTAL, unless coordinated with the

engineer prior to submission. These resubmissions need to include all shop drawings and cut sheets, whether previously approved or not, and shall include new submission index/bill of materials and dates as if the package were a brand new submittal.

13. Under no condition shall the contract Drawings be re-titled, or otherwise reprocessed, and used as a Shop Drawing submission.

E. Sample Boards

1. Immediately after approval of shop drawings, this Contractor shall create, on site, an installation "sample board" with each intrusion detection, duress, access control, and communication devices, mounted on the actual, to be used, back box and extension ring, complete with wire and or E.O.L. terminations and tagging to represent final mounting, conduit and wiring connection and identification methods for Commissioner's and Engineer's approval. Approved sample board shall be the standard for fieldwork inspection and quality control and used as reference for the balance of the project.
2. Contractor shall also mock up one of each typical CCTV camera/dome and bracket assemblies and mounting kit, contractor must mount unit on same or similar mounting surface where unit will be installed.
3. Samples of each system device, as reflected in Shop Drawings, for return to the Contractor, as follows:

Each type of magnetic contact switch

- b. Card reader/keypad
  - c. Each type of motion detector
  - d. Local audible door alert
  - e. Duress button
  - f. Camera and typical lens used in galleries/public spaces
  - g. Each type of cable, adequate length to show factory cable ID marking.
  - h. Wire tags
  - i. One of each type of cable connector - individually labeled with intended use.
  - j. One sample of each, to be submitted with shop drawings and prior to installation of conduit, pulling of wire, construction of interior partitions, or commencement of finish work, in or on which the device is to be installed, to provide coordination detail requirements with other trades. Samples shall be returned for Contractors' use after review period. (Refer to shop drawing submission schedule in next article.) Samples may be assembled on site for Commissioner's review to minimize shipping. All samples shall be present for a single review session by the Commissioner.
4. One sample of each, to be submitted with shop drawings and prior to installation of conduit, pulling of wire, construction of interior partitions, or commencement of finish work, in or on which the device is to be installed, to provide coordination detail

requirements with other trades. Samples shall be returned for Contractors' use after review period.

F. Demonstrations And Hook-Ups

1. The contractor shall make themselves available with related security equipment to provide the client, Commissioner and/or engineer, demonstrations and mock-ups of proposed security device (camera, sensor, etc.) locations. These demonstrations/mock-ups are to provide first hand coordination and examples of:
  - a. Camera heights, locations and aesthetics
  - b. Camera viewing angles and lens adjustments
  - c. Sensor, heights, locations and aesthetics
  - d. General security equipment layout due to sizing (example: PC work station and monitor sizing)

G. Coordination Drawings

1. The Contractor shall create field installation Coordination Floor Plan Drawings, which specifically convey the required conduit size and cable routing to accomplish specified system operations using conduit, equipment and cabling submitted in the Shop Drawings, factory installation requirements, engineering calculations, sample board, and coordinated with all other trade work, as represented by Shop Drawings for other trades.
2. The Security Contractor shall advise the Construction Manager, Electrical Engineer and Electrical Contractor of any additional 120/220 VAC requirements prior to electrical rough-in to insure a cost effective coordination of this work.
3. Where device or equipment relocation (other than SDF locations) to a position, other than that shown on the Security Drawings is required, as a result of coordination with other trade work, relocations of up to 15 feet shall be provided at no additional cost or credit to the City of New York.

H. As Built/Record Drawings And O&M Manuals

1. The Contractor shall create and maintain in accordance with the General Conditions and this Section, the following evidence of the "As-Built" condition of the project.
2. The Contractor shall maintain, on the job site, one complete dedicated set of Drawings and Specifications of all items which are part of the system's installation and all changes of materials, equipment, or dimensions from the contract documents

or shop drawings shall be recorded and kept current on a daily basis and shall be made available to the Engineer at all times during the construction process.

3. The Contractor's schedule of amounts for monthly contract payments as required by the General Conditions shall include an allowance for preparation and delivery of the required As-Built.
4. Upon completion of the work, Contractor shall furnish final As-Built Drawings showing work as actually installed, to be submitted as a part of the "Project Manual."
5. Submission shall be signed by the Contractor with a certification attesting to correctness, and marked "As-Built", and dated, with Contractor's title block. Final submission shall also be provided on CAD disks, using AutoCAD 2005 or latest version at time of creation.
6. Operations and Maintenance Manuals (O&M)
  - a. The manuals should include a security system overview report. This report should be the first item in the manual under cover of the index. The overview should include information as to the operation, integration and intent of how the overall security system has been installed and is to operate. All security system head-end subcomponents (CCTV, ACS, IDS, Intercom, etc.) should be mentioned.
  - b. (CCTV, ACS, IDS, Intercom, etc.) cut sheets with exact part numbers highlighted and/or called out.
  - c. The manuals should include maintenance, operation and reset procedures/information for all security equipment.
  - d. The manual should include spreadsheets with security device, cabling, cable labels/identifiers, equipment descriptions, equipment identifying labels (for coordination with As-Built drawings, etc.).
  - e. The manual should include all Security Distribution Frame (SDF point-to-point wiring in a spreadsheet form.
  - f. The manual should include any client coordinated/specified program and sequence of operations criteria.
  - g. The manual should be laid out in a neat and concise format and should include an index, which will correlate with major security subsystem (CCTV, ACS, IDS, Intercom, etc.) index tabs. Each index tabbed section should also be broken down further with individual colored separator pages between subsections and/or individual security devices.

- h. The manual shall be submitted either in 3 ring binder or bound booklet fashion format with a front cover and spine that indicate the job, the system and the date of submission.
7. As-Built Documents shall include, but not be limited to, showing the following details.
- a. Rigid and flexible conduit size, location, routing path, and dimensional offset from column lines. Entire system piping shall be shown. This shall include in-slab and underground conduit, used for security cabling.
  - b. Conductor size, type, color and numerical codes, and numbers in raceway, as well as all plenum cable or wiring run outside of conduit system.
  - c. Systems type identification, circuitry and zoning numbers of conductors.
  - d. Size and type of raceway and cable and its in-site placement within the structure, using dimensions and architectural "landmark" references (column lines) wherever possible.
  - e. Type of device, and cable installed (manufacturer, model number, functional description) and spares remaining.
  - f. All monitor and control equipment panels locations and type, size, capacity and spares remaining.
  - g. All back up battery power supplies, type, low voltage side connection circuitry, and 120/220 VAC side circuit no., panel and connection type.
  - h. All security system equipment shown on the contract documents, approved shop drawings, or otherwise utilized as part of the system installation, and associated connection diagrams to equipment provided herein, provided by other trades, or connected to City of New York-provided equipment.
  - i. Interface drawings to other systems such as fire alarm and power operated doors, etc.
  - j. Control equipment internal module schematics, including electronic assemblies, interface wiring, and external field device signal, power, and circuit wiring.
  - k. Areas of equipment application and zones of detection, and location of equipment, complete with site designations, room names and numbers, door numbers, etc. Review room and door names and numbers with the Construction Manager prior to submission.

8. A legend explaining all abbreviations and details.
9. In addition, any other information as required by the Engineer to adequately describe the "As-Built" condition.
10. This Contractor shall create his As-Built Drawings in such a manner so that the As-Built Architectural conditions are referenced and used as backgrounds. It is the intent to incorporate the Security System As-Built work into the overall building Contract Architectural As-Built Drawings. The As-Built Drawings made by this Contractor must therefore incorporate the information identified on those prints.
11. CAD plot (AutoCAD 2005), thin line (half-tone equivalent/grey scale) architectural floor plans may be made available by the Commissioner for this purpose, upon written request. Contractor's option is to obtain equivalent CAD disks of floor plans from Commissioner. In either case, the Contractor shall create floor plan backgrounds for As-Built accordingly.
12. Use manufacturer's printed information where applicable, otherwise obtain or generate written instructions. Where control panel connection/wiring diagrams are provided by the manufacturer, include as part of the as-built drawings and modify "factory generic" connections to the specific conditions for this project.
13. Returned As-Built Documents for resubmission and review, shall abide by the following criteria:
  - a. As-Built document resubmissions shall be resubmitted with a copy of the engineer's original review report. The resubmission will respond in writing to each item of the engineer's original review report, specifying what has been done to update, change, and/or rectify the original comment.
  - b. As-Built document resubmissions shall be resubmitted as a whole package, NOT AS A PARTIAL SUBMITTAL, unless coordinated with the engineer prior to submission. These resubmissions need to include all drawings and O&M manuals, whether previously approved or not, and shall include new submission index/bill of materials and dates as if the package were a brand new submittal.
14. Under no condition shall the contract Drawings be re-titled, or otherwise reprocessed, and used as an As-Built document submission.

I. Permits

1. The Contractor shall take out and pay for all permit applications, licensing fees, and submit any working drawings required by applicable sections and required by all approving authorities, and in accordance with applicable sections of the General Conditions and project Specifications.

J. Test Reports

1. Test reports are required for the work of this Section. These reports shall be submitted to document pre-acceptance factory equipment "burn-in" test, as well as documentation of all site tests performed for final system functional checkout and acceptance. Two test reports shall be submitted as required for review and record documentation purposes.

## 1.5 INTENT

- A. It is the intent of the Specifications and Drawings to call for finished work, tested, ready for operation and programmed specifically for this site and City of New York's requirements.
- B. Any apparatus, appliance, material or work not shown on Drawings but mentioned in the Specifications, or vice versa, and any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be provided without additional expense. Coordinate with each system manufacturer to insure all software, hardware, firmware, relays, or other necessary components are provided prior to bid submission. Discuss specific interconnect requirements for CRL site and BL site including Software House hardware and software with the existing CRL site security integrator.
- C. Minor details not usually shown or specified but necessary for the proper installation and operation, shall be included, the same as herein specified.
- D. In all cases wherein apparatus herein referred to in singular numbers, it is intended that such reference include as many such items as are required to complete the work.
- E. Specifications are of simplified form and include incomplete sentences. Words or phrases such as "the Contractor shall", "shall be", "furnish", "provide", "a", "an", "the", and "all", may have been omitted for brevity.
- F. Work under jurisdiction of the State and local Fire Marshal (electrically locked door control systems) shall comply with requirements set forth by the Fire Marshal.
- G. The latest edition of NFPA Sections 70, 72, and 101, and State of New York and City of New York Building, Fire and Electrical Codes, and associated amendments to same, shall be the minimum requirements for all conduit, wiring, and related materials, methods and operating functions.
- H. Additional requirements of local authorities having jurisdiction shall be provided as required to achieve system approval and sign off.
- I. In brief, the scope of the security work is as follows:
  1. Furnish factory approved equipment design for each of the specified systems.
  2. Provide all system equipment, conduit, wire, etc. for each specified system.

3. Install all system equipment, conduit, wire, etc. for each specified system, coordinated with other trades in accordance with the project construction schedule.
4. Furnish As-Built drawings and operation and maintenance manuals, in a "project manual" format.
5. Provide shop burn-in test, contractor self-check test, and final turnover operation test for each device and control function of all systems, complete through operation of central station equipment.
6. Scheduling with the General Contractor and City of New York for the installation and testing of security system devices and controls and commissioning/testing of said system, and training of City of New York's staff, in accordance with the construction schedule.
7. Program and Load Database for: IDS/CA system and CCTV video system as directed by the City of New York or his designated representative.
8. Create IDS/CA ID credentials utilizing City of New York supplied artwork.
9. Coordinate and implement the design and furnishing and installing of all labor and material required to interconnect the PAL and CRL site.
10. Provide first year maintenance and service to maintain first year guarantee and warranty as part of Base Bid price.
11. Coordinate with the CRL site security integrator and the NYPL IT department to achieve WAN interconnect between the two site security systems.

J. Nothing contained in the drawings and specifications shall be construed to conflict with applicable State and local laws, codes, and ordinances. Comply with drawing and specification requirements which are in excess of minimum code requirements.

#### 1.6 EQUIPMENT SUBSTITUTIONS

- A. Refer to the General Conditions of the General Requirements for stipulations governing the approval of items proposed as equivalent to specified manufactured items. In addition to terms and conditions identified therein, requests for approval will not be considered unless they are submitted and are accompanied by, minimally, the following information:
  1. List of **three** similar scope installations arranged to show name of project, equipment application, system size, capacity and date of installation completion, contact person and phone number;
  2. Complete literature, performance, and technical data describing the proposed equipment, including size, power requirements, detection, reporting, and programming capabilities, wiring requirements, installation, maintenance and performance criteria, limits or constraints on operation, listings and labeling by Testing Agencies, compatibility with integrated systems, etc.;
- B. Requests for approval shall not be considered if they are not accompanied by simultaneous submissions of the specified equipment.
- C. Specifications of proposed equivalent items will not be reviewed unless an item by item physical and electronic performance comparison to the specified product is provided to allow a complete comparison of products/systems to the Commissioner's satisfaction.
- D. The Commissioner reserves the right to refuse any request for approval on the basis of its requirement to maintain a uniformity of equipment purpose, function, maintenance and

service, to achieve compatibility with other portions of the installation, electronic interconnect to existing systems in the CRL or aesthetic requirements as dictated by the Commissioner.

## 1.7 BASE BID

- A. Contractor shall set forth the Base Bid total cost for a complete installation of the specified system components, all work completed.
- B. Refer to the Security System Drawings and Security Specifications and balance of the contract documents for other base bid requirements.

## 1.8 TEST AND ACCEPTANCE

- A. This Contractor shall carry all time, equipment, manpower, etc., to provide the required tests for the project. Tests shall be conducted in two distinct categories (A) Factory Tests and (B) Field Completion Tests.
- B. Factory Test
  - 1. Factory tests of individual components shall be provided. If manufacturers do not provide such tests, contractor shall bench test equipment at their shop prior to delivery to site.
  - 2. The primary systems listed below shall be configured at the contractor's office in such a manner to insure primary system hardware, firmware, and field communication and control panels operate prior to arrival on site.
    - a. Access Control System
    - b. CCTV System
  - 3. Provide documentation of factory tests by submitting copies of factory test sheets, which can be unequivocally identified as the test report for equipment shipped to the job site.
- C. Field Completion Test
  - 1. Tests shall be made of the completed system under conditions simulating as nearly as is practically possible, final installed conditions using actual system components. These tests shall show conclusively that the requirements of the Contract Documents, have been fulfilled, and as required in this Specification Section.
  - 2. Documentation: Keep full and thorough records of all tests, in tabulated, permanent reproducible form, completely indexed and explained, indicating the specific test

performed, participants, environmental conditions such as temperature and humidity, date of performance, results obtained, corrective actions taken (if any), (and by whom), final results, and comments if required.

3. Copies of all tests shall be delivered to the Construction Manager, Commissioner or his designated representative prior to scheduling final system acceptance test. Identify all malfunctions as either work performed under this contract or under another contract.
4. Costs associated with the repair of equipment provided by the Contractor and found faulty in the test process shall be the Contractor's responsibility.
5. All instruments, ladders, scaffolding, lifts, testing equipment and labor required for all tests shall be furnished by the Contractor.
6. The operation of individual components of equipment as part of these tests does not constitute a final acceptance of the work by the City of New York. The final acceptance is to be made after the Contractor has adjusted his equipment and demonstrated that it fulfills the requirements of the Specifications and Drawings, all punch list items are completed and retested/inspected, successful completion of City of New York's acceptance test, and the systems have operated for 15 consecutive days without fault or failure, as complete, operational, on-line systems. Should a fault or failure occur, in a particular system, the 15-day period shall commence again after the required repair, for that system.
7. Upon completion of the installation and prior to acceptance, the Contractor shall thoroughly clean (internally and externally) all equipment furnished and/or installed under this Section.
8. All systems shall be restored by the Contractor to full operating capacity and operating capability after testing
9. The Commissioner or his/her designated representative shall be notified in writing of all scheduled tests at least 15 business days in advance, so that he/she may witness same. Un-witnessed tests shall be performed again at no expense.
10. Should the Contractor not pre-test the system prior to making official notification of being ready for the final acceptance tests, and should a final test be conducted and malfunctions or unfinished work be evidenced, the cost of retesting and professional travel and inspection fees shall be borne by the Contractor.
11. The Contractor shall complete his work in a timely manner and coordinate with the Construction Manager to accomplish tests for final acceptance during business hours (8 am - 5 pm), Monday through Friday, prior to City of New York occupancy. Should tests need to be conducted after hours or on weekends or holidays, due to improper scheduling of work, premium costs for Commissioner oversight shall be borne by the Contractor.

12. Prior to the final "Turnover Meeting Acceptance Test", the Contractor shall provide a system "initial check-out" test. Each system component shall be tested alone and for system operation and shown to operate successfully. It is the intent of this test to check out all systems to establish any system failures or faults prior to the final tests in the presence of the City of New York or his designee. Manufacturers' requirements, engineers, or factory/dealer support shall be solicited and obtained by the Contractor to insure all systems perform as specified herein and per manufacturers' requirements.
13. Upon completion of the installation and system "Initial check-out" test, a "Turnover Meeting Acceptance Test" shall be held at the site at which the Commissioner or his designee, Construction Manager, the City of New York, system equipment suppliers, and all associated Sub Contractors are present. The manufacturer's representatives shall also be advised and their presence requested in writing for attendance. At this time, a functional test of the entire system and all its components shall be demonstrated.
14. Functional test shall include all security sub-systems and their components, and their equipment and any interfaced systems.
15. Testing procedures set forth in this Specification Section, shall conclusively show that all interfaced device functions are achieved, minimally as follows:
  - a. Complete operation of the individual building's intrusion detection panels and keypad arm/disarm partition status display system, and its interface to the intrusion detection and access control systems.
  - b. Intrusion detection and access control system LAN and software fully functional and operates in accordance with project specific, City of New York-approved and the contractor loaded database.
  - c. Complete operation of CCTV system, and its interaction with the access control and intrusion detection system.
  - d. Complete operation of battery and standby power systems, including all battery power charging circuits, and proper equipment function of all low voltage power supplies and the UPS system.
  - e. Complete operation of the card access control system including field multiplex panels, card readers, electric locks and door contacts.
  - f. Complete operation of the video badging system, and its digital image database retrieval system with the IDS/CA system.
  - g. Complete operation of the emergency communication system.
16. Prior to gaining approval to conduct final "Turnover meeting acceptance testing", the installing Contractor must provide the Construction Manager or his designee with a

preliminary test report, (from "Initial check-out" test) enumerating each component of each system tested and showing satisfactory results, as achieved during "initial check-out" test.

17. After completion of installation, and as part of "Initial check-out" tests, and prior to "Turnover meeting acceptance test", a factory-trained technician shall test and certify each system's operation. Test shall also certify that equipment is installed in accordance with approved factory means and methods.
18. A letter of certification indicating that each system functions and conforms to all specifications herein shall be presented to the Construction Manager, Commissioner or his designee prior to "Turnover meeting acceptance test", as part of the "Initial check-out" test documentation.
19. Prior to "Turnover meeting acceptance test", the Contractor shall provide one complete set of the approved equipment shop drawings and wiring diagrams for use by the Commissioner or his designee during the "Turnover" test process.
20. In order to facilitate the final "Turnover" meeting test, the Contractor shall prepare "Test Site/Floor Plans" which give the alarm point monitoring panel security zone address of each intrusion detection device, each partition component identity of the IDS systems, CCTV camera number, card reader circuit address, and each emergency communication station so that immediate recognition of device tested and system reaction can be verified as part of the final "turnover" test.
21. As-Built drawings shall be available during the final turnover meeting test so their accuracy can be verified by the Engineer in the field.

#### 1.9 CITY OF NEW YORK TRAINING

- A. Contractor, as part of this work, shall train no fewer than five (5) designees of the City of New York in the operation of the equipment, prior to final systems' acceptance.
- B. Such training shall include instruction in automatic and manual operation of all system components and equipment. Training shall be provided by qualified, factory trained and certified engineers familiar with each sub-system's operations and shall be provided at the site for a period of no less than seventy-two (72) hours of instruction to five (5) persons, as follows:
- C. Operator level training shall include five (5) 4-hour days (20 hours) of course material minimally encompassing the following:
  1. Sequence of operation review
  1. Sign on-sign off
  3. Selection of all displays and reports
  4. Commanding of all input and output points, keyboard and mouse mode
  5. Commanding of all card reader, IDS/CA addresses
  6. Input of/creation of English language text reports
  7. Use of all dialog boxes and menus
  8. Interaction with the graphic user interface
  9. Interaction with the video database call-up routines

10. Use of satellite operator terminals and printers
- D. Supervisor level training shall include an additional five (5) 4-hour days (20 hours) of on-site instruction and two full days (16 hours) of instruction at the manufacturer's training facility, encompassing:
1. Creation and modification of cardholder database
  2. Modifying alarm limits and start-stop times
  3. Purge and/or dump of historical data
  4. Password assignment/modification
  5. Operator assignment/modification
  6. Point disable/enable, access/secure schedules
  7. Use of card issuance routines
  8. Use of report software with system data
- E. System's manager programmer level training shall include two (2) 8-hour sessions (16 hours), on site, encompassing:
1. Graphic user interface creation and modification
  2. System initialization
  3. Download and initialization of remote panels
  4. Troubleshooting of sensors (determining bad sensors)
  5. Terminal and data segregation/modification
  6. Creation and modification of all site-specific user-defined fields
  7. English language text programming
  8. Software review of Sequence of Operation and flowcharts
  9. Use of diagnostics on site
  10. System maintenance procedures
  11. Review of initialization
  12. Upload/download on off-line archiving system software
  13. Graphic creation
  14. Factory diagnostic routines, on-line with manufacturer
  15. English language text programming
- F. Supervisor and system manager/programmer level training shall be for three City of New York personnel.
- G. Scheduling of the City of New York training prior to completion of the work shall be coordinated with the City of New York. Training sessions shall be provided at the City of New York's option and availability.
1. Training sessions may, at the City of New York's option, be spread over a six month period.
- H. The Contractor shall arrange training sessions at least 15 business days in advance to accommodate trainee schedules of availability.
- I. The Contractor shall provide a training agenda, including all required pictorial and any other required training material to the City of New York fifteen (15) business days prior to the training session. The training agendas shall be provided to the Commissioner for preliminary review prior to their submission to the City of New York.
- J. The specified system training manuals shall be provided a minimum of ten (10) business days in advance of training sessions to provide adequate time for staff training preparations.

- K. The Contractor shall provide the services of factory trained and certified instructors who will give full instruction to designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements, of the equipment and system actually installed.
- L. Instructors shall also assist in the development of the system's required database creation, through an interactive dialogue of text, system displays, and oral training/example sessions with the City of New York's security staff until adequate familiarity is obtained by the City of New York to participate in the completion of the database by the Contractor.
- M. The training shall be based on the system installed rather than being a general (canned) training course. Instructors shall be thoroughly familiar with all aspects of the subject matter he/she is to teach, and of this system as installed. An agenda of subject matter and hours devoted to same shall be provided ten (10) days in advance to allow City of New York scheduling of staff participation.

#### 1.10 DEFECTS

- A. Should it be found that material furnished and installed under this Section fails to comply with the Contract Documents, it shall be rejected and replaced in accordance with the General Conditions, by the Contractor, and all work disturbed by changes necessitated in consequence of said defects or imperfections shall be made good at the Contractor's expense. Particular attention is called to the installation details of most equipment, making replacement more difficult than initial installation. The Contractor is cautioned to check out all devices for function before installation.
- B. Only new products and equipment shall be utilized for this Contract. Refurbished, reconditioned, repaired or components used in any way shall be considered "defective" and rejected from the project.

#### 1.11 GUARANTEE AND WARRANTY

- A. The Contractor shall guarantee and warranty in accordance with the General Conditions, all work called for in the Contract Documents. Date of City of New York acceptance will be the date of first day of first year guarantee and warranty, as well as maintenance and service, as called out in these Specifications.
- B. The Contractor shall secure warrants from all equipment suppliers and provide the City of New York or its designated representative with copies of each, for each piece of equipment, as part of the "Project Manuals". Each warranty and guarantee shall state that all work performed will be free from defects in materials and workmanship for a period of one (1) year from date of final written acceptance by the City of New York, unless guarantees for longer periods are provided by equipment suppliers or required elsewhere in these Specifications. The warranty and guarantee shall state that any defects in workmanship and/or materials appearing in the work or operation of system or components of system within the prescribed time will be corrected without costs (labor and material) to the City of New York within two (2) days after receipt of written notice from the City of New York, if such defects or faults do not prevent proper operation of the system, and shall further agree to repair or replace any and all damages to the system caused thereby at any time or times during the guarantee period.

- C. If detection, reporting, access control, arming/disarming communications, or video surveillance system operation is compromised, provide emergency 24 hour, service response as outlined below.
1. Particular attention is called to the fact that the Contractor is to include the necessary maintenance [labor and materials] for all system equipment and components to provide for this one-year warranty in his Base Bid. Validity of the one year warranty requirement is not to be voided, canceled, or shortened by any requirements for special or additional service, during the first year of operation, after the date of system acceptance.
- D. The Contractor shall be responsible to provide, during guarantee and warranty period, emergency service response, including labor and materials, within a minimum of 6-8 hours of receipt of telephone call or fax for service from the City of New York. Such response shall be required for calls placed regardless of hour, day or night, business day or Holiday. Such emergency service response shall be for repair of system component failures, wiring faults, or other system related circumstances, which compromise functional performance.
- E. Where acts of God, negligence and abuse, acts of vandalism or other such occurrences cause damage to the system, emergency maintenance and service agreement shall stipulate hourly rates for business hours and overtime hours, travel rates and reimbursable expenses, spares stocking requirements, and a "return-to-on-line" performance path that identifies time and equipment performance milestones and contractor service and management staff dedications and equipment resource dedications to minimize and define "time-off-line" without opportunity for ambiguity. These line item cost and corrective performance identifications are a minimal requirement.
- F. The Contractor shall include, in the first year, as part of the guarantee and warranty, two (2) bi-annual inspections and complete device-by-device and complete system operational tests of the installed system after acceptance to verify proper operation of components. First test shall be provided at Month No. 6, the second during Month No. 12, from the date of City of New York acceptance.

#### 1.12 PRODUCT HANDLING AND PROTECTION

- A. Deliver, store, handle, and install all devices and system equipment, to prevent damage. Deliver materials in their original unopened containers, cartons, and packing, unless "prior-to-delivery" bench testing was performed, in which case boxes shall be marked "bench tested". Store where protected from damage, from exposure to the elements, and theft.
- B. Turn over operation and installation booklets contained in equipment shipping boxes to the City of New York as part of the "Project Manuals."
- C. Coordinate with the General Contractor and the City of New York or his designated representative for site access and availability of lockable and secure storage.
- D. Where installation of security system equipment occurs prior to completion of space, provide temporary protection of all equipment to maintain "as new" condition.

- E. Loss of inventory due to theft, vandalism, etc., shall be the Contractor's responsibility until the written system acceptance date.
- F. The Contractor is responsible for protection of all stored and installed materials, equipment or systems until the written date of accepted turnover. Damage from vandalism, theft, lightning, or other acts of God or man shall be repaired by the Contractor to the specification and drawing standards and requirements at the Contractor's expense.

#### 1.13 ENVIRONMENTAL CONDITIONS

- A. Do not store, install, or expose, prior to, during, or after installation, any Security System device or device or control panel equipment, in an environment in which the temperature drops below 45\* F, rises above 95\* F, or comes in proximity to or contact with strong magnetic fields, corrosive fumes, paint, static electricity, dust, moisture, etc.
- B. Check all 120/220 VAC feeds for clean power, clean grounds, hi/lo voltage and amperage, etc., prior to any equipment connection.
- C. Check all cables for shorts, grounds, induced voltages or other spurious noise, which could adversely affect system components or performance, prior to connection of any signal transmission equipment.
- D. Protect all equipment from other construction activities such as dust, paint, and sealers, using non-damaging protective means.
- E. Protect all equipment, devices and cables installed to achieve protection from other contractor activities.
- F. Protect all equipment from lightning and voltage surges. Damage due to lightning strikes or voltage surges prior to system acceptance shall be repaired by the Contractor at his own expense.

#### 1.14 JOB COORDINATION

- A. The work specified under this Contract requires complete coordination. Special attention is called for coordination with the appropriate trade contractor in the preparation of drywall, masonry, wood, steel, concrete, and other general construction details, the Electrical Sub-Contractor for connection to the 120/220 volt AC system, and the installation and layout of the security system conduit and required electrical boxes and trough box, the Hollow Metal Manufacturer and Hardware Supplier for access control door unlocking system, electrified exiting hardware control and door contact preparation, the Hardware Supplier for the provision of the electrified door unlocking hardware, the General Contractor/Millwork Fabricator and Installer for coordination of security equipment mounting at the lobby security desk. It shall be the Contractor's responsibility to initiate, generate, maintain and respond to all such coordination efforts, with these and other trades.
- B. This Contractor shall dedicate whatever time is necessary in working with the appropriate Contractors for General Construction, Millwork Contractors, storefront/aluminum curtain wall fabricator and installer, Electrical Contractors, Hardware Suppliers, Door and Frame

Manufacturers and Installers to insure coordination of Security System equipment, wiring, and conduit layout for the purpose of achieving the installed system as shown on the Contract Drawings.

- C. Special attention is called for concerning coordination of hollow metal door and frame suppliers, hardware suppliers, Electrical and Security Contractor in placement of all devices, wiring, and door and frame preparation for door contacts, access control system equipment, wire terminations, cable selection, conduit routing and mounting of all associated equipment.
- D. All doors and frames scheduled to receive magnetic contact devices shall have them recess mounted. This Contractor shall provide all details and wiring information to the Door and Frame Suppliers to insure recess mounting of contacts, concealment of wiring, and maintenance of factory guarantees and fire and sound rating labels.
- E. Access control door unlocking system equipment and electrified hardware shall be wired strictly in accordance with manufacturer's instructions provided by the Hardware Supplier, access control manufacturers, and lock power supply manufacturer.
- F. Any wiring through hollow metal, aluminum or wood doors and/or storefront construction shall be through factory or "providing-trade" raceways. Security contractor shall coordinate with other trade divisions and fabricators to insure these raceways are provided and sized for wiring approved in the Security System Shop Drawing submissions.
- G. Intercom stations, as well as card readers, shall be mounted on walls and conduit and wires routed through same in a manner approved and supervised by the wall contractor and Construction Manager to maintain wall integrity, waterproofing, moisture/vapor barriers.

#### 1.15 CLIENT/CONTRACTOR COORDINATION

- A. Contractor shall set up and participate in no fewer than four (4) coordination meetings, with the client or their representative, for program and sequence of operation criteria determination.
- B. The contractor shall provide a skeleton outline, in a spreadsheet format to the client, of the security ASC/IDS labeling system. The spreadsheet shall have a column with the labeling/address of each device, as originally entered into the head-end system, and a second blank column which will allow the client to either create their own tag/labeling system, of each device, and/or in conjunction with a short descriptive phrase to uniquely identify the equipment, as they wish to see it when operating the system. There should also be a third column that will allow the client, if they so choose, to group/zone certain devices.
- C. Once this document is produced and turned over to the client, the contractor shall either work with the client to complete the spreadsheet, or leave it with the client for their perusal and return to this contractor. The contractor will use this document in conjunction with the sections of this specification that are associated with the initial programming of the ACS/IDS system.
- D. The contractor shall provide a spreadsheet outline of the CCTV camera and monitoring system. It shall include columns with camera, monitor, NVR, etc., labels as initially entered

into the system for set-up. It is to have blank columns for the client to either create their own tag/labeling system, of each device, and/or in conjunction with a short descriptive phrase to uniquely identify the equipment, as they wish to see it when operating the system.

- E. Additional columns shall be included in the spreadsheet, which will allow the client to provide rough camera image groupings to show up on certain monitors, in addition to columns that will allow for spot and/or call-up monitoring.
- F. Once this document is produced and turned over to the client, the contractor shall either work with the client to complete the spreadsheet, or leave it with the client for their perusal and return to this contractor. The contractor will use this documents in conjunction with the sections of this specification that are associated with the initial programming of the CCTV system.
- G. The contractor(s) shall make themselves available for any client/client representative requested coordination issues related to the program, and sequence of operations of the building, as relates to the programming and integration covered under the security scope of work.

#### 1.16 SPECIAL CONSULTANTS

- A. In the event that the Contractor is required by the design of the system, job conditions, equipment specifications, existing conditions or by special installation requirements, to employ the service of special consultants, factory or system maintenance/technical engineers, system installers, factory representatives, etc. to aid in the performance of the work, such shall have been included in the Contract Amount.
- B. The Contractor is to minimally include two site visits for each system. The systems are as follows intrusion detection/access control, and CCTV. The contractor shall provide Factory technical support on-site. One site visit for assistance and inspection of work in progress, and a second site visit for system commissioning, set-up, and certification prior to Engineer's review and sign-off.
- C. All systems shall be set up, wired, adjusted, tested, commissioned and turned over to the Construction Manager, Commissioner and City of New York with the assistance of factory technicians and security contractor's installation team, complete with a certification of fitness and operation from the factory technical representative. This shall be accomplished during the contractor tests.

#### 1.17 QUALIFICATIONS OF BIDDERS

- A. At the request of the Construction Manager or Commissioner, bidders must detail their qualifications to undertake and complete this Project. Declarations of qualifications must list installations of equal cost and technical scope; must represent evidence of seven (7) years of experience in installing and servicing of access control and video surveillance, etc.; must represent experience in project site area (within 50 miles of site); and maintain a crew of maintenance and service personnel capable of providing the specified guarantee and warranty service. In addition, the Contractor shall provide written documentation of his current State license, indicating date of renewal and any qualifications. The Contractor must

also document any factory-authorized affiliation with the manufacturers of specified equipment.

- B. Bidders must provide documentation that they themselves are factory-authorized representatives/installers of all systems specified.
- C. A single prime Contractor shall be responsible for all work of this Section and as shown on the Security Drawings. The Contractor shall make whatever arrangements are necessary with an Electrical Contractor for conduit and box work and all wiring to insure a complete bid price for the entire raceway system (conduit, back box network, wire mold, etc.).

#### 1.18 SUPERVISION OF WORK

- A. The Contractor shall furnish the services of an experienced Foreman who shall be constantly in charge of the installation of the work. Foreman shall have experience in the installation of similar **scope** security systems, and shall have equivalent skills and training of a licensed Master Electrician.
- B. The Contractor shall perform all work under the supervision of representatives of the manufacturer(s) of the new systems equipment. Costs for such supervision shall be borne by the Contractor and included as necessary in the Base Bid.

#### 1.19 JOB CONFERENCES

- A. A pre-installation Job Conference shall be convened including the Commissioner, Construction Manager, Electrical Sub-Contractor, Hardware Supplier and Installer, Storefront Door Installer, Security Contractor and other parties deemed necessary, in order to insure a complete coordination of the security system work and its impact on other trades.
- B. A security system coordination job conference shall be conducted at the time of security shop drawing submission by the Construction Manager to insure coordination of the security shop drawings prior to their submission to the Commissioner.
- C. Job conferences shall be held as required while construction is in progress. Contractor shall attend, or be represented at such meetings. Should the Contractor elect to be represented, it is to be understood and agreed upon that in dealing with Contractor's representative, the full assurance that such representative's actions and commitments may be accepted the same as though the Contractor who signed and is bound by the Contract, were himself present and personally made such agreements and commitments, in accordance with all terms and conditions of the Contract Documents. Representation will only be allowed if approved, in advance, by the Construction Manager, Commissioner and City of New York.

#### 1.20 REFERENCE STANDARDS

- A. When standards of the Federal Government, the State, the City, trade societies, or trade associations are referred to in the Contract Documents by specific date of issue, these shall be considered part of the Contract. When such references do not bear a date of issue, the

current published edition at date of First Invitation to Bid shall be considered as part of this Contract, including supplements thereto.

- B. Codes and Regulations, In addition to the codes and regulations identified in the Division 1 General Requirements and Division 26, the following codes and standards shall be adhered to and shall not be contravened without approval from the Engineer or Governmental Agency having jurisdiction:
1. All Federal, State and Local codes governing (latest issue)
  2. NFPA 101: Life Safety Code (especially Section 5, Means of Egress)
  3. NFPA 70: National Electrical Code
  4. ADA: American Disabilities Act
  5. ANSI: American National Standards Institute
  6. ASTM: American Society for Testing & Materials
  7. NEMA: National Electrical Manufacturers Association
  8. EIA: Electronic Industry Association
  9. UL: Underwriters' Laboratories, specifically
  10. UL 294: Access control system units
  11. UL 1076: Proprietary burglar alarm system units
- C. Notify the City of New York and the Commissioner or his designated Representative of any materials or apparatus believed to be inadequate, unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction.
- D. In case of differences between Building Codes, State and Federal laws, local ordinances, rulings by the authority having jurisdiction, and utility company regulations and the Contract Documents, the most stringent will govern.
- E. The minimum standards for system equipment installation and configuration to be the recommendations of each manufacturer.

- F. Should work be performed which does not comply with the requirements of the applicable building codes, State and Federal laws, local ordinances, industry standards and utility company regulations, changes for compliance shall be performed at no additional cost to the City of New York.
- G. All material and equipment shall conform to the applicable NFPA, UL, NEC, EIA, ANSI, ADA and NEMA Standards and Requirements.
- H. If any additional requirements of the City of New York are identified after bid award, the consequences of any requested modifications shall be reviewed in a meeting between the City of New York, Commissioner, Construction Manager, the Engineer, and this Contractor, for the purpose of obtaining a cost and time schedule impact.
- I. Refer to Division 1 and 26 for further code and regulatory agency requirements.
- J. Ratings of devices and equipment specified without reference to specific performance criteria shall be understood to be nominal factory or nameplate ratings or performance criteria established by means of industry standard procedures and manufacturer's specifications.
- K. Definitions:
  - 1. Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."
  - 2. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, rigging in place, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
  - 3. Provide: The term "provide" means to "furnish and install, complete and ready for the intended use".

#### 1.21 FINAL ADJUSTMENTS

- A. The Contractor to the complete satisfaction of the Commissioner or his designated representative, the authority having jurisdiction and the manufacturer's representatives shall accomplish the adjustments of the system(s) and components.
- B. The Contractor shall advise the City of New York of any access codes, keys, program settings, factory default codes, used during set up and testing, etc., and shall invalidate same at system acceptance time, only after turn over of complete documentation to the City of New York, and the provision of proper systems use training, as directed by the City of New York's Project Manager.

#### 1.22 ACCESSIBILITY

- A. Locate all equipment, which must be serviced, operated or maintained in fully accessible positions, especially when located in concealed locations. If required, for better accessibility, advise the Construction Manager to authorize the trade in which the access door will be mounted to furnish access doors for this purpose, after coordination with the Commissioner.
- B. Minor equipment location deviations from Drawings may be made to allow for better accessibility, but changes of magnitude or which involve extra cost or exposing equipment, shall not be made without prior approval.
- C. Minimum clearances in front of or around equipment shall conform to the latest applicable manufacturers requirements for inspection and testing, and the NEC for control panel and junction box access, (treat all control panels, power supplies, etc., pull and junction boxes, for access, as though they were 120 VAC leaving a minimum of 3'-0" clear in front of same, floor to ceiling).
- D. All Security System equipment, except wiring and conduit, shall be completely accessible without the requirement to remove any portion of building structure or other system component, except a man-sized access door or ceiling tile.
- E. Enclosure access doors shall be hinged and arranged to allow full swing open and complete access to all enclosure components and wiring.

#### 1.23 NAMEPLATES (NOT SIGNAGE)

- A. Each major component of security equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. Nameplate of a manufacturer's representative or a distributing agent will not be acceptable. FCC, UL, EIA, NEMA, or other Code ratings, or other data, which is die-stamped into surface of equipment to be positioned in an easily visible location.
- B. Provide Lamacoid plastic laminate labels on all terminal or equipment cabinets, power supplies, control panels, and control equipment, to clearly identify device number, system type, function, operation, and status. Labels for all equipment shall be submitted to the City of New York for approval, and all labels shall:
  - 1 Be reflected on the as-built drawings for all respective equipment.
- C. Laminated plastic shall be 1/8" thick Melamine plastic, blue with white center core. Surface shall be a matte finish. All corners shall be square. The characters shall be accurately aligned and engraved into the white core. Size of nameplates shall be 2" by 3" minimum. Provide larger nameplates where text requires. Characters shall be in accordance with "Arial" letter style standard or approved equal.
- D. Labels shall be securely affixed using screws or rivets. Two-sided adhesive tape will not be accepted.

#### 1.24 SECURITY SYSTEM IDENTIFICATION

- A. All equipment and cabling shall be properly identified by means of clear and concise labels.
- B. Permanently label, using pre-printed labels, all cables and terminations. Handwritten or embossed type labels are specifically prohibited.
  - 1. Label all cables at both ends between field device and SDF (Security Distribution Frame).
  - 2. Label all cables at both ends between SDF (Security Distribution Frame) and Security Headend Equipment Room.
  - 3. Label all equipment racks, panels, and cross connect blocks uniquely.
  - 4. Label patch panels and cross-connect blocks numerically, top-to-bottom.
  - 5. Label cable segments by designated incoming cable.
- C. Labels
  - 1. Provide color-coded labels with CODED identifiers as follows:
    - a. Conduits and other pathways shall be labeled at all end points, including SDF's, head-end equipment rooms, telecommunications closets, pull boxes and the like. Provide adhesive labels on all conduits, with at least one label within each space that the conduits pass through. Labels shall be attached by means of the label adhesive and color-coded pressure-sensitive tape wrapped around conduit at least one and one-half times.
    - b. Cables shall have double lapped adhesive labels at all end points including Field Device Outlets, SDF's, telecommunication closets and equipment rooms. Cables shall also have factory imprinted manufacturer's name and part number, along the entire length of the cable.
    - c. Termination hardware shall have adhesive labels on both the front and rear (if accessible) of the hardware.
    - d. Outlet boxes, junction boxes, and the like shall have adhesive labels attached on the inside and located where visible from the outlet opening.
    - e. Grounding and bonding systems shall have engraved labels at each ground bar and backbone grounding cable as it passes through each room. Each bonding jumper shall have heat shrink labels at all end points.

2. Labels shall be constructed of approved material in order to meet the legibility, defacement, adhesion (adhesive labels only), and exposure requirements of UL 969. All labels shall be mounted horizontally in order to be read from left to right.

#### 1.25 MANUFACTURERS

- A. Each manufacturer shall refer to his respective Section of the Specifications and all general articles of this Section, before bid due date and after bid award. Contractor shall provide each potential equipment manufacturer with these Specifications when soliciting price quotations and for potential order placement.
- B. Failure of the Contractor to provide manufacturers with the appropriate portions of the drawings and specifications may be the basis for rejection of his Bid or denial of a Change Order associated with required modifications to systems as a result of manufacturers' non-participation in bid price preparation and/or order placement.
- C. Each manufacturer shall thoroughly familiarize himself with all specified products relating to the Work and submit written objection prior to bid if he objects to the proposed use of any product of his manufacture or in operation with his equipment as shown on the drawings and/or specifications.
- D. During construction, each manufacturer shall visit the site periodically to observe the installation of his product. The manufacturer shall notify the Commissioner and the Contractor immediately if his product is not being installed or connected to as recommended by the manufacturer of the product.
- E. Upon completion of the Work each manufacturer shall certify, in writing, that his product was installed, or connected to, in accordance with the manufacturer's installation instructions and recommendations and the installation is accepted by the manufacturer as compliant with these requirements.
- F. A safe product and safe equipment as required by codes or standards are the responsibility of the manufacturer. Necessary safety labels and safety instructions shall be provided by the manufacturer and included in the Project Manual. Contractor installation techniques or methods, which affect the safety of a product, shall, when observed by the manufacturer, be corrected in accordance with the manufacturer's written recommendations.
- G. Contract Documents are based on the manufacturers specified. If more than one manufacturer is listed, the Contract documents are based on the first manufacturer named to establish functions, quality, space, and operating features, and other manufacturers may be considered an approved equal, as long as they are configured by the manufacturer to provide the features and functional capability of the primary listed product, achieve the required system's integration with other products and the requirements of this Specification Section.
  1. When manufacturer part numbers and/or systems are listed, all the specification requirements for that part number and/or system may NOT be detailed in these bid documents. Bidders are hereby notified that they are required to meet or exceed all the manufacturers published specification requirements, including specification requirements not detailed in these bid documents.

- H. The access control and CCTV system manufacturers shall certify that proper equipment is submitted during shop drawing process, and that hardware and/or software is shipped and installed on site to achieve complete functional stand alone and integration systems operation with the balance of system equipment specified.

#### 1.26 SPECIAL EQUIPMENT AND CONNECTIONS

- A. Furnish all fittings, conduit associated with panel to panel and panel to trough connections through wire ways, boxes, hangers, wiring devices, enclosures, signage, fasteners, connections, control panels, relays, and miscellaneous accessories necessary for the complete installation of the Security System and final connections to equipment furnished by other trades and/or the City of New York.
- B. Furnish engineering support, project management coordination, and develop detailed diagrams which identify the required wiring interface between the vehicle gate control and card reader system, ADA power operated doors and card reader system, and delayed exit locks, their power supplies and the fire alarm system.
- C. Engineering Drawings are, of necessity, schematic for systems equipment as exact roughing requirements vary slightly with different manufacturers and job conditions. The Drawings represent an accurate, but schematic, depiction of the Security System conduit and wire network layout for the system equipment specified. However, final conduit and wire quantity, size, and arrangement, as well as final routing, and placement, may vary based on the shop drawing approval of system equipment, manufacturer's engineering requirements, field coordination with other trade work, and as a result of other trade equipment which it must be connected to.
- D. The Security Contractor shall furnish and install wire and shall connect to all equipment indicated on the Drawings and as required by the manufacturer and the approved shop drawings at no additional expense to the City of New York. The Security Contractor shall advise the electrical contractor of any required conduit modifications, including size, routing, back boxes, junction boxes, pull boxes, to achieve complete coordination with the approved security equipment and wiring diagrams provided in the shop drawing submission process.

#### 1.27 CITY OF NEW YORK FURNISHED AND/OR EXISTING SECURITY EQUIPMENT

- A. The City of New York may furnish equipment and devices for installation under this contract, as indicated herein.
- B. The Contractor or his representative will be required to sign an itemized equipment receipt for City of New York supplied equipment. After receipt, the Contractor will then be held responsible and liable for the loss of, or damage to the equipment until the job is completed and accepted by the Commissioner.
- C. Any City of New York-furnished equipment and/or devices that are not installed for any reason shall be returned to the City of New York's Representative.
- D. City of New York furnished equipment includes the CRL Software House head-end platform and modifications to same to adapt it to the WAN interconnect with the BL site.

#### 1.28 ARRANGEMENT OF WORK

- A. The drawings are partially diagrammatic and indicate general arrangement of the work. Drawings may not show all work specified. Consult the balance of the project contract documents drawings and specifications for additional installation requirements, equipment and exact locations and space coordination, and coordinate installation with the work of other trades.
- B. Maintain maximum headroom and accessibility for maintenance, and prepare large-scale drawings of the work where tight space conditions exist and where installation conflicts appear likely. Secure the approval of other trades and the Commissioner before proceeding.
- C. Refer to respective Architectural Reflected Ceiling Plans for ceiling mounted devices, and respective Architect's Interior and Exterior Elevations for wall mounted equipment.
- D. Where Architectural Reflected Ceiling Plans or Interior and Exterior Elevations do not show devices or equipment, lay out all wall and ceiling mounted devices on each floor in a walk-through with the Commissioner. Tag or suitably mark all device locations as directed by the Commissioner and use as location for actual, final rough in.
- E. If a walk through with the Commissioner does not locate all devices not shown on architectural drawings, request in writing "location-sketches" of devices still not located by the Architect. If such sketches are not provided after such written request, timely notice, and construction schedule requires rough in, mount in accordance with locations shown on Request for Information (RFI) detail drawings created by the Contractor and submitted to the Commissioner for clarification and approval.
- F. When work calls for "homerun" connections, include all work necessary to bring wire to that location as part of the bid price.
- G. For any equipment located so that maintenance or service requires removal, leave adequate cable slack for equipment maintenance and terminations in the panels. Failure to leave adequate cable slack may be cause for rejection of work and complete rewiring, without any allowance for splices or terminal blocks by the contractor.
- H. Where security system cabling must be co-mingled with other system cables, the security contractor shall coordinate the cable installation and conduit sizing with the appropriate contractors.

#### 1.29 VERIFY JOBSITE CONDITIONS

- A. Before commencing work, examine all existing and adjoining work on which this work is in any way dependent for perfect workmanship according to the intent of this Specification. No "waiver of responsibility" for incomplete, inadequate or defective "existing" conditions or "adjoining" work will be considered unless notice has been filed prior to commencing work.
- B. Become thoroughly familiar with actual existing conditions at the building site. The intent of the work is shown on the drawings and described hereinafter, and no consideration will be

granted because of lack of familiarity on the part of the Contractor with actual physical conditions at the site.

- C. Review conduit system in building, trough, cable trays, door frames/storefront construction curtain wall assemblies, and insure proper installation of wiring can occur. Review any precluding field conditions with the Construction Manager and Commissioner.

#### 1.30 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with the respective trades responsible for installing interface work, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.
- B. Refer to the overall scheduling of the work of the project. Schedule work, process Submittal and order materials and equipment to conform to this schedule, and install work to not delay nor interfere with the progress of the project.
- C. Inform Commissioner immediately of any delays or potential delays. Furnish manufacturer's letter to verify order date, equipment delays, expected shipment date, order number, and potential remedies to speed up delivery. Any costs to speed up delivery shall be implemented at no cost to the project if the equipment or material was not ordered as soon as possible after Contract award.
- D. Include premium time required to comply with the project scheduling and phasing.
- E. Be aware of, and plan for, project scheduling and phasing. Provide for complete continuous operation of all systems. Coordinate scheduling and phasing with the Commissioner, City of New York, other Trades, and the General Contractor.

#### 1.31 CONTINUATION OF SERVICES

- A. Initial requirements include all materials and labor for maintaining the West End Concourse camera
- B. Continuity of all services shall be maintained in all areas that will be occupied or temporarily relocated during the construction period. If an interruption of service becomes necessary, such shall be scheduled in advance, made only upon consent of the City of New York and at a time outside normal working hours as the City of New York shall designate.
- C. All materials, cabling, and labor necessary to make ready any temporary connections between all systems during all construction phases shall be included.
- D. All materials, cabling, and labor necessary to make ready any temporary locations for security system connections for personnel moves during all construction phases shall be included.

- E. During all construction phases, provide all equipment, materials, cabling, and labor necessary to provide for the seamless integration of all existing and new security systems.

#### 1.32 SUBCONTRACTING OF WORK

- A. Skilled personnel directly employed and supervised by the Electrical and Security System Contractors shall perform all work.
- B. The Contractor or his representative will be required to sign an itemized equipment receipt for City of New York supplied equipment. After receipt, the Contractor will then be held responsible and liable for the loss of, or damage to the equipment until the job is completed and accepted by the City of New York.
- C. Any City of New York-furnished equipment and/or devices that are not installed for any reason shall be returned to the City of New York's Representative.

#### 1.33 AUTHORIZED CHANGES IN CONTRACT WORK REQUIREMENTS

- A. The Contractor shall note that the Contractor shall make no changes in the work requirements or scope of work under this contract without a written modification to the contract in accordance with Division 1 of the Specifications.

#### 1.34 PROJECT CONSTRUCTION PROGRAM

- A. This project consists of the installation of multiple security systems, the specifications and drawings package has been developed with the intention of soliciting a price in competitive bid format for each package. The intention is to obtain a price and to provide systems product procurement, systems integration and systems installation as shown on the drawings and as stated in the specifications. The construction schedule requires that the contractor complete the building so that the building is open and available for use, as required. Therefore, the contractor is to include, in the project, appropriate project management and systems integration, commissioning, testing and training. The contractor's price shall reflect an understanding of this construction schedule and provide the necessary materials delivery, integration and project management, as required. The contractor is strongly advised to review the project construction schedule and criteria with the construction manager prior to bidding.

## PART 2 - PRODUCTS

### 2.1 SYSTEM COMPONENTS

- A. All materials shall be strictly in accordance with the manufacturer's model numbers, performance levels, quality, style and sizes as specified herein. Manufacturers' names and model numbers are given in the Specifications for the purposes of establishing a standard of performance, quality, style, size and type.
- B. When the Contractor is allowed and elects materials or equipment other than that specified, the Contractor will be held responsible for all structural, mechanical, and electrical changes required for their installation at no additional cost to the City of New York. All changes shall be subject to the Commissioner or his designee's complete written approval in accordance with The General Conditions and Section 1.06 of these Specifications.
- C. When the Contractor receives approval of an equal, he shall include, during the Shop Drawing submission process, complete specifications of the item along with specifications of each specified product, indicating the necessary modifications to, or differences from the specified product to satisfy requirements of the Contract Specifications. Approved equal manufacturer's Specifications shall be written as close as possible over the Contract Specifications to aid comparisons.
- D. When a manufacturer's product has been superseded by a newer model, the later model shall be furnished, provided the newer model retains the essential characteristics of the item specified herein and maintains compatibility with integrated systems hardware and software. Indicate in submission if such condition exists.
- E. The materials and equipment to be furnished shall be new and unused and fabricated from new materials. Factory "reconditioned" products are not allowed.
- F. Materials and equipment shall be, where so specified, UL labeled, as required, and shall bear the manufacturer's name, model number and any other Listing Agency identification markings.
- G. Materials and equipment shall be the standard product of a manufacturer regularly engaged in the production of the required type of material or equipment for at least three (3) years (unless specifically exempted in writing by the Commissioner or his designee) and shall be the manufacturer's latest design with published properties.
- H. Equipment and materials of the same general type shall be of the same manufacture throughout the project to provide uniform appearance, operation and maintenance.
- I. The specifications package reflects the range of anticipated system equipment and components to be used as part of the completed security system. The Contractor should refer to the security system drawings to determine the extent of product/system requirements necessary. If the drawings show a product which is not called out in the Specification, confirm product manufacturer and model number with Commissioner prior to purchase. If additional equipment is required due to specific job conditions or systems' configuration,

products and equipment shall be supplied in accordance with the required submission process to create a complete and operational system

## 2. 2 EQUIPMENT SPECIFICATIONS

### A. Security System Intrusion/Environmental Detectors:

1. Magnetic Contacts: Clad Wiring in Stainless Steel Armor Sheath, unless wiring runs in conduit from homerun junction box to contact dust box mounted to frame.
  - a. For recess hollow metal, use GE 1078/1076 Series 3/4" gap. Closed loop contact type to provide fully supervised circuit loop.
  - b. For recess glass doors with aluminum frames, use GE 1125W, 3/4" gap. Closed loop contact type to provide fully supervised circuit loop.
  - c. For surface mount use GE 2507-AH, high security biased type 3/4" to 2 1/2" gap. SPPT contact type to provide fully supervised circuit loop.
  - d. For recess wood use, GE 1125W, 3/4" gap, closed loop contact type to provide fully supervised circuit loop.
  - e. For special cross section, dimensionally small, hollow metal/aluminum doors and frames, use GE 1090 Series, utilizing a standard 4-7/8" x 1-1/4" mounting plate, integral with the contact. (This contact is to be used when other units will not fit due to frame sizing.)
  - f. For rolling grilles, sliding doors, and shutters, use GE 2304, up to 3" gap, or 2207A-H or 2507A-H, 3/4" to 3" gap contact-type to provide fully supervised circuit loop. High security-biased type. Do not use contacts that require a floor mounted device.
  - g. For surface mount access doors use GE 2507-AH, high security biased type, 3/4" to 2 1/2" gap. Contact type to provide fully supervised circuit loop.
  - h. Provide all contacts with sufficient wire lead length and stainless steel armor sheathing to allow an installation free of exposed conductors, unnecessary splices, and inappropriately placed junction boxes between contact mounting and connection to alarm signal homerun cables and their associated junction box. Note: Contacts generally are manufactured with standard 1'-0" pigtailed. Review installation application and conduit and junction box rough-in prior to purchase and order longer pigtailed, as required.
  - i. Propose alternate type unit, if desired, after identifying each door/frame geometry, using Commissioner's and Aluminum Storefront and Hollow Metal Supplier's Door Schedule.
  - j. Color selection per door by the Commissioner from manufacturer's standard color range.
  - k. Wherever possible, Contractor shall use approved factory manufactured configuration of door contact with built-in and potted end of line resistors to eliminate field installation of resistors and to provide continuous stain-less steel sheath potted into door contact switch body.
  - l. As manufactured by GE, (Tel. #1-800-547-2556) or approved equal by GRI or Ademco. All to be UL listed.

### 2. Hardwired "Call-for-Help" Buttons:

Shall be as manufactured by GE, UL listed Model #3050. Complete with bi-color latching LED and single pole, double throw contacts. Tel. #1-800-547-2556, or approved equal by Ademco.

### 3. Motion Detectors:

- a. Ceiling Mounted Units: Shall be as manufactured by Bosch Model No. DS 938Z, or approved equal from the following manufacturers Sentrol, C&K, DSC. Final decision based on field detection condition requirements associated with room construction. Detectors shall be as selected by the Commissioner. All to be UL listed.
  - b. Wall Mounted in Corners: Shall be as manufactured by Bosch Model DS860 standard or optional coverage patterns based on specific application coverage requirements, (review with Commissioner) with swivel bracket hardware and masking kit, or approved equal by Ademco, DSC, Napco All to be UL listed
  - c. Wall Mounted with Long Range Pattern: Shall be as manufactured by Bosch, Model #DS-794Z with required mounting and detection pattern/aiming, standard or optional coverage patterns based on specific application coverage requirements, or approved equal, or approved equal by Ademco, Sentrol or DSC. All to be UL listed
4. Security System Equipment Panel or Enclosure Door Plunger Tamper Switches:
    - a. Shall be as manufactured by Sentrol, Model #3017, 30141, 3014, or 3027, with or without clip based on panel/enclosure construction. UL listed, or approved equal.
  5. Security System Equipment Panel or Enclosure Door Roller Tamper Switches:
    - a. Shall be as manufactured by Sentrol, Model # 3002, 3005, or 3008 based on condition to be monitored. UL listed, or approved equal.
  6. Local Audible Alarms:
    - a. Shall be as manufactured by Design Security Inc. (DSI), Model # ES4300A. UL listed, or approved equal.
  7. Strobe light:
    - a. Provide UL listed, 120 Volt high intensity LED Strobe light as manufactured by Carson's Electronics (903-498-3363) or approved equal. Confirm location and sequence with NYPL Security prior to programming.

B. Wire and Cable: Plenum Wire / Pipe Stubs & Back boxes

1. Low Voltage, Security Alarm Signal Cable: To be twisted, single pair, stranded, shielded cable, with shield drain wire, with overall jacket, gauge calculated to compensate for length of run, and current requirements. All conductors for security zone signal to be minimum #20 AWG, UL listed. All wire to be color coded. One pair # 20 AWG per security device zone required. West Penn Wire (WPW) #25292 or approved equal by Belden. (Note: This is a guide specification, insure cable used is approved by equipment manufacturer. Shields and twisted wire are required unless prohibited by the manufacturer. 20 AWG is a minimum wire size unless prohibited by the manufacturer.)
2. Low Voltage Security Device Power, 12 VDC: Shall be minimum of #18 AWG for runs up to 200', and a minimum of #16 AWG for runs up to 300', twisted, shielded, stranded, with shield drain wire, UL listed, jacketed, pair, separate color code from any other power circuits, as follows:
  - a. WPW #25293 (up to 200')
  - b. WPW #25294 (up to 300')
  - c. Or approved equal by Belden.
4. IDS/CA, Card Reader/Keypad Data and Power Cable: Shall be in accordance with manufacturer's instructions for specified system. Note requirement for powering LEDs and audible beeper function. Shall be as manufactured by Belden, or West Penn Wire. Cables to be shielded with shield drain wire unless specifically prohibited, in writing, by the manufacturer. Confirm with manufacturer or card reader and access control system reader interface prior to purchase.
5. IDS/CA System RS 232 and 485 Communication Bus Cable: Shall be in accordance with manufacturer's requirements for specified system. Shall be as manufactured by Belden, or West Penn Wire. Cables to be shielded with shield drain wire unless

specifically prohibited, in writing, by the manufacturer. Confirm with manufacturer prior to purchase.

6. Local Audible Alert Power Cable: Shall be minimum of #18 AWG for runs up to 100, WPW #25293, twisted, shielded, stranded, jacketed pair, UL listed, separate color code from any other power circuits. Over 100' use #16 AWG. WPW #25294 or approved equal by Belden.
7. CCTV System Cables:
  - a) Video Cable: For runs up to 750' shall be four (4) Pair CAT 6 cable for video signal and single pair 18 AWG plenum cable for camera power. Camera power cable shall terminate in SDF. CAT 6 cable shall interface to Video Balun Transceivers at both ends of the CAT 6 Cable, at the camera in the field and at the DVR Headend in the SDF.
    - 1) Low Voltage Mini-Dome Cameras Power Cables shall be West Penn Wire #18 AWG, twisted, shielded, stranded, UL listed with drain wire, Model #25294, or Belden equivalent..
    - 2) 24 VAC Camera and Dome Power Cable Cabling for integrated camera and dome exterior unit must be per manufacturers cabling guidelines. Identify and submit for approval.
    - 3) For CCTV power cable run in conduits in slab on grade or underground conduit which has been shown to contain water, #16 AWG shall be WPW #TC1602, rated for direct burial.
8. Panel and Enclosure Grounding Cable: Alarm panel and enclosure grounding, lightning suppression, and 120VAC surge suppression drain cable shall be #8 AWG, copper cable.
9. Data Communication, Loop Wiring: Wiring shall be 2 pair, #20 AWG, twisted w/overall shield, with drain wire. Provide appropriate cable, per the recommendations of the system's manufacturer, as required.

C. CCTV System:

1. Interior and Exterior Fixed Day/Night Color Dome Cameras: Shall be as manufactured by Panasonic Super Dynamic III, Day/Night, Vandal Proof Dome Camera , Model #WV-CW484. Chip size - 1/3"; Type – Color; Mechanism – Fixed; Structure – Vandal-Proof; Resolution 540 Lines (high color mode) & 570 lines (B/W mode); Minimum Illumination – 1.5 lux in color, 0.16 lux in B/W; Power 12V DC / 24V AC; Day/Night Switching; Auto Back Focus; Scene Change Detection; Adaptive Digital Noise Reduction; Digital Motion Detection; Auto Image Stabilization.
  - a. Lens: Provide applicable lens, as approved by Commissioner, for proper view of each individual camera.
    - 1) Lens 2.2mm Wide Angle Lens, Model #PLA22T3DN
    - 2) Lens 2.9 – 8.0 mm Vari-focal Lens, Model #PLZ29/27
    - 3) Lens 15 - 50 mm Vari-focal Lens, Model #PLZ15/33
  - b. Surface Mounts: Provide surface mounting base Model #WV-Q114.
  - c. Recessed Ceiling Mounts: Provide recessed ceiling mount Model #WV-Q166.
  - d. Vandal Proof Wall Pendant Mounts, provide Model PPM474SA.
  - e. Vandal Proof Wall Pendant Mounts, provide Model PPM474SA.
2. Interior Programmable Dome PTZ Camera:
  - a. Shall be the SpeedDome as manufactured by manufactured by American Dynamics Ultra 8 Model ADSDU822I2X2N series, no substitutions. The

dome assembly must be comprised of a high-speed pan/tilt assembly, high-resolution color camera with 22X optical zoom, 11X digital zoom permitting up to 242X total zoom, and a horizontal resolution of 470TVL. The camera/lens assembly must provide for continuous, full-time, autofocus capabilities..

- 1) Camera configuration shall be in clear dome version.
  - 2) Install using applicable power supply.
  - 3) Provide USB Control Module, Model ADACSNET manufactured by American Dynamics, no substitutions.
4. Provide two (2) Video Balun Transceivers for each camera, shall be as manufactured by Nitek (or approved equal).
- a. Fixed Cameras shall use Video Balun Transceiver Model VB37M at camera location.
  - b. PTZ Cameras shall use Video Balun Transceiver Model VB37F at camera location.
  - c. Headend location, shall use Rack Mounted Multi-Channel eight (8) port Video Balun Transceiver Model VB839. Provide quantities to supporty all CCTV cameras plus 10% spare.
5. CCTV 17" Flat Screen Monitors:
- a. Shall be as manufactured by Belkin Model F1DC101P-DR or equal. CCTV monitors shall be 17" flat screens and will be integral to the DVR's PC's. The DVR computer workstations will show the video images at the front desk and the security managers office.. Provide (2) with all applicable cabling.
6. CCTV System: Digital Video Recording (DVR) System:
- a. Shall be as manufactured by American Dynamics, no substitutions. Video shall be recorded and viewed at the Library Branch and also viewed on the Software House CCure 800 system at the Central Library control center. After regular branch hours video recording of alarm events form the ACS/IDS shall be forwarded to the central library.
  - c. Intellex Digital Video Management System (DVMS) shall be as manufactured by American Dynamics, Model ADD6R0DVDV100, no substitutions. Eight (8) channel desktop with 500GB storage. Used for Library Branches with over four (4) cameras and less than 8 cameras.
- D. PC Based IDS/CA, Intrusion Detection/Alarm Point Monitoring/Control Equipment:
1. This site is to be an extension of the existing Software House system currently installed at the New York Public Library, Central Research Library Facility.
  3. Upon an alarm from an armed area, alarm inputs, on a point-by-point basis, report to the Software House APC multiplex panels which, in turn, communicate with the CRL head-end PC via an Ethernet WAN.
  4. Alternate arrangements of equipment which provide for a single PC based system, providing the required IDS/CA controls, system alarm event recording and printing, and local arming and disarming of partitioned areas with an indication of the armed or disarmed status at the keypad will NOT be considered due to the required interface with the existing CRL Software House System.
  6. Equipment Specifications:
    - a. Time of Delivery Performance Criteria: Due to the rapid changes in computer hardware and software development, the contractor shall provide, at time of installation, the most current version of computer hardware, printers and operating system software. The contractor shall carry, in his price, all monies and fees to upgrade software and hardware to meet the current technology at the actual time of the equipment installation.

- b. Backward and Forward Compatibility: The contractor shall ensure that all hardware and software, prior to the completion and acceptance of the contract, shall be upgradeable and backward compatible with any portion of the installation including existing Software House Systems currently installed at CRL.
  - c. Field Multiplex Panel-Alarm Point Monitor and IDS/CA Panel: As manufactured by Software House, Model IStar, complete in lockable and tampered enclosure, supporting 16 card readers, with 8 hours of standby battery backup, and loss of AC alarm reporting or approved equal. Actual panel module count and sizing based on field device density as shown on the security drawings. Utilize add-on reader boards, input and output boards as required to achieve reader interconnect shown on drawings and risers. Configure with WAN network connection and dial back-up.
    - 1) As manufactured by Software House, Model STAR0016W-64A, no substitutions. Supports up to 16 readers. For use with Library Branches connecting back to IDS/CA headend for single audit trail and central monitoring functionality.
      - a) Provide PCMCIA Modem Card shall be as manufactured by Software House Model STAR PCC-Modem and all other components for a completely operation system to interface the IDS/CA Panel by Software House, Model STAR0016W-64A to an analog telephone line to backup primary communication (in the event that the primary communication has failed) to the NYPL Centrally located C-Cure 800 System.
    - 3) Advanced Power System provides uninterrupted power for the iSTAR intelligent IDS/CA and alarm point monitoring panels. Provide for each panel. As manufactured by Software House, Model AS0063-00, no substitutions.
  - d. Security System Software: Provide all required software to effect a complete and operational system.
  - e. Miscellaneous System Integration Components: Provide any required additional software, firmware, hardware, modems, hubs, network interface cards, licenses or other required integration components to effect a complete and operational system.
  - f. IDS Function Keypad with LCD Displays and HID Prox: Shall be as nmanufactured by Software House model RM2L-PH with LCD display and HID proximity reader, no substitutions.
  - g. Card Readers shall be as manufactured by HID, Models Thinline II for wall mount and Miniprox for jamb mount.
- F. Power Supplies for IDS/CA System and CCTV System shall be as manufactured by Preferred Power Products.
- 1. Rack Mount Chassis Model P3RK2RU, provide -1.
  - 2. Modular Card 24VAC Model P3M24-8-4, provide -2.
  - 3. Modular Card 12VDC Model P3M12D-8-4, provide -2.
- F Uninterruptible Power Supplies shall be manufactured by APC and shall be of the SMT1500 Series. The sizing of the units are to be matched to each individual security equipment area load criteria per the security drawings.

- G. Network Switch shall be as manufactured by Linksys, for interfacing the IDS/CA System and the DVR to the NYPL WAN System via a single data port or optional fiber module.
1. 8-Port 10/100/1000 Managed Gigabit Switch with PoE Secure, intelligent, managed gigabit switching with PoE.
- H. Wall Mounted Equipment Cabinets
1. Provide for security system and as indicated on the bid documents.
  2. Mounting Height – The top of the Wall Mounted Cabinet shall be mounted 72 inches AFF.
  3. All rack-mountable equipment shall be installed utilizing tamper-proof screws into a equipment cabinet.
  4. Each wall Mounted Equipment Cabinet shall be a swing-out wall-mount cabinet, sized appropriately to accommodate at least 125 percent of the equipment to be installed. Cabinet features shall include the following:
    - a. Cabinets shall be welded construction, steel or aluminum, piano-hinged doors with keyed locks and access handles. Door locks shall be keyed alike. Color shall be approved by the Commissioner. Front door shall have integral shatter-proof vision panels in a metal frame.
    - b. Integral EIA 19-inch (518 mm) wide, four (4) post equipment rack. Rack shall be as described herein this specification. Rack shall be located within the cabinet in order to properly mount all passive and active electronic components.
    - c. Shelves for electronic equipment with load-carrying capacity to support at least 125 percent of each piece of electronic equipment weight. Shelves shall have adequate openings within them to dissipate heat and allow for adequate electronic equipment ventilation.
    - d. Provide proper termination of Bonding and Grounding Jumper Cable to all Equipment Racks and Equipment Cabinets.
    - e. Bonding and grounding cables for all equipment not directly bolted to equipment rack (i.e. shelf-mounted electronic equipment, etc.).
    - f. Bonding and grounding bus bar with individually set screw terminals for at least six #6 Cu. bonding cables.
    - g. Surge-protected power strip as described in this specification.
    - h. All hardware, supplementary steel, channel and supports as required to properly assemble the cabinet and secure it to the building structure per manufacturer's recommendations.
- I Surge Protected Power Strips.
1. Manufacturer: Provide products meeting the requirements of the Drawings and Specifications from one of the following Manufacturers:
    - a. Wiremold Sentrex, TrippLite, or S.L. Weber.
  2. Surge-protected power strip shall be rack-mount type.
  3. Surge protected power strip with outlets having 20 amp capacity, 120 volts, UL 1449 listed, maximum surge current of 33,000 amps, clamping voltage of 260 volts, maximum 5 picoseconds response time, reset-able overload circuit breaker, surge suppression warning light, surge protection for line to neutral, line to ground, neutral to ground, EMI/RFI filters.
  4. Power cord shall have a NEMA 5, 20A twist lock plug.
    - a. Provide a minimum of one (1) for each rack or cabinet installed.

## 2.3 SPARE PARTS

### A. General

The following list of spare parts shall be quoted with the Security System:

### B. Security System Intrusion:

1. Magnetic Contacts: Four contacts of each type.
2. Motion Detectors: One detector of each type.
3. Tamper Switch: Two of each type.
4. End-of-Line Resistors: 20 spare of each value.
5. Fuses: Two of each type
6. Alarm Zone Input Expansion Board: One
7. Output Relay Expansion Board: One

### C. CCTV Equipment:

1. Fixed Closed Circuit Video Cameras: one
2. Eight fuses of each type

## PART 3 – EXECUTION

### 3.1 GENERAL

- A. The requirements of PART 1 and PART 2 of the Specifications also apply to the execution of the work.
- B. Color coordination for all equipment, devices, furniture, etc. being provided for this project.
  - 1. Security Contractor shall review and coordinate color of the following and obtain from the Commissioner approval of all colors prior to ordering:
    - a. Each type of field device
    - b. Mounting Brackets for field devices
    - c. Security Console Furniture including counter/desk top
    - d. Monitors, Flat Screens, Displays
    - e. PC Workstations
    - f. Security System Racks
    - g. Security Equipment within racks
    - h. Blank plates and screws
    - i. Screws, fasteners, nuts, bolts, etc.
  - 2. All colors shall be reviewed and approved by Commissioner from manufacturers standard color range.
- C. Verify the exact location prior to bid of all items that may be indicated and determine exact location of all electrical items that are not indicated on the Drawings.
- D. Include the cost of all work, including sub-letting of any work that may be required to complete the work indicated, in order to avoid work stoppages and jurisdictional disputes. The work to be sublet shall conform to precedent agreements and decisions of record. Jurisdictional assignment shall be a responsibility under this Section's contractual obligation.

- E. Do not install equipment and materials that have not been reviewed by the Commissioner. Equipment and materials that are installed without the Commissioner's review, or without complying with comments issued with the review, shall be removed from the project when so instructed by the Commissioner. No payment will be made for unapproved equipment or materials, or removal if they are ordered removed. The Installer shall be responsible for any ancillary costs incurred because of its removal, and for the installation of the correct equipment and materials.
- F. At the start of construction, consult with the General Contractor and all Trades, and determine and verify the electrical characteristics of all equipment that is supplied under the Contract.
- G. Obtain detailed information on installation requirements from the manufacturers of all equipment to be furnished, installed, terminated and/or provided. At the start of construction, check all Contract Documents, including all Drawings, and all Sections of the specifications, for equipment requiring electrical connections and service, and verify electrical characteristics of equipment prior to roughing.
- H. Equipment and systems shall not be installed without first coordinating the location and installation of equipment and systems with the General Contractor and all other Trades.
- I. Any and all material installed, or work performed, in violation of above requirements shall be re-adjusted and corrected by the Installer without charge.
- J. After installation, equipment shall be protected to prevent damage during the construction period. Openings in conduits and boxes shall be closed to prevent the entrance of foreign materials.
- K. Delivery, Storage, and Handling:
1. Deliver, store, protect, and handle products in accordance with recommended practices listed in Manufacturer's Installation and Maintenance Manuals.
  2. Deliver equipment in individual shipping splits for ease of handling; mount on shipping skids and wrap for protection.
  3. Inspect and report concealed damage to carrier within specified time.
  4. Store in a clean, dry space. Maintain factory protection or cover with heavy canvas or plastic to keep out dirt, water, construction debris, and traffic. Provide heat enclosures to prevent condensation. Meet the requirements and recommendations of NFPA 70B and the Manufacturer. Location shall be protected to prevent moisture from entering enclosures and material.
  5. Handle products in accordance with NEMA and the Manufacturer's recommendations and instructions to avoid damaging equipment, installed devices, and finish.

6. The equipment shall be kept upright at all times. When equipment has to be tilted for ease of passage through restricted areas during transportation, the Manufacturer shall be required to brace the equipment suitably to insure that the tilting does not impair the functional integrity of the equipment.
7. Loose materials shall not be stored on-site. The Installer is responsible for all equipment and materials, and for their delivery until the system is deemed complete and accepted by the City of New York.
8. Site observation visits will be performed randomly during the project by the Commissioner. Reports will be generated noting observations. Deficiencies noted on the site visit reports shall be corrected. All work shall comply with the Contract Documents, applicable Codes, regulations, and local Authorities, whether or not a particular deficiency has been noted in a site visit report.
9. Be responsible to notify the Commissioner ten working days prior to closing-in work behind walls, raised access floors, ceilings, etc., so that installed work can be observed prior to being concealed.
10. Work concealed prior to observation and correction of deficiencies shall be made accessible for review at the discretion of the Commissioner. Subcontractor shall bear all costs for reviewing work.
11. Areas shall stay accessible until deficiencies are corrected and accepted. Notify the Commissioner when all deficiencies are corrected. Return reports with items indicated as corrected prior to re-observation by the Commissioner.

L. Change Orders, Modifications, Revisions, and Directives:

1. When change orders, modifications, revisions, or Commissioner's Directives are issued or authorized, provide the required additional material, equipment, personnel, and workers to prevent delays in the work, and to complete the work within the time limit of the Contract, unless a specific time extension is requested with the change and accepted. Include costs for expediting deliveries, where required.
2. Requests for additional compensation shall be submitted broken down and associated by item, task and Drawing, or sketch number, with material and labor costs, so that quantities can be easily verified.
3. Requests shall be properly and adequately identified so the scope of work can be clearly determined. Indicate who originated change in work.
4. Cost breakdowns shall be submitted complete with backup for material and labor units and costs. Backup shall consist of actual vendor invoices or quotes, or from well-known national organizations such as R.S. Means Company, National Trade Service, Union labor rates or approved equal. Installing firm's in-house standard database for labor units may be used if consistent with the national organizations.

5. Submit on all credits, broken down as requested for adds. Credits shall be separately identified and accounted for. Do not indicate as net changes with adds.
6. Unit costs for labor and material shall be equal for adds, deletes and credits.

### 3.2 DESIGN

- A. The final arrangement of conduit, cable sizing, type and routing will be dependent on the approved equipment selected as part of the shop drawing submission process. The Electrical and Security Contractors are hereby cautioned and instructed to install conduit, wire, point to point and homerun routing and sizing in accordance with the approved conduit and wire drawings submitted jointly by the Electrical and Security Contractors. The selection of backboxes, extension rings and cover plates for device mounting shall be installed per these same criteria. The Electrical Contractor shall furnish and install conduit and pull wire provided by the Security Contractor in accordance with the approved security shop drawings submitted by the Security Contractor.
- B. The Contractor is required to read the Specifications covering all aspects of the work and will be held responsible for coordination of his work with work performed under all other contracts.
- C. Building security and IDS/CA system shall comply with the rules and regulations of the local Building Code, and as required for all government approvals.
- D. All systems are to be factory engineered to provide the functions described herein and as provided by the capabilities of the products specified in Part 2.00 of these Specifications.
- E. Calculations and drawings shall be furnished by the Contractor for this system which shall meet the requirements of approving and listing agencies, the Commissioner or his designee.
- F. The Security System Contractor shall include in his Bid the cost for factory engineering and field tests to verify design calculations and system performance as required for approvals.
- G. If the Contractor has any questions concerning the Plans and Specifications, he is to contact the Commissioner in writing, for clarification prior to bid, to fully understand the extent and responsibilities of his work.
- H. Security System design shall be based on calculations which provide for the functioning of all devices shown on the drawings and functions as specified herein.
- I. The Security System Contractor is responsible for locating all ceiling mounted detection devices in all suspended or other type ceilings, in accordance with Architectural Reflected Ceiling Plans. This Contractor shall also refer to Architectural Reflected Ceiling Plans for locations of other trade items in ceiling systems where shown. As above, for wall mounted equipment, refer to Architectural Interior and Exterior Elevations.
- J. The contractor shall include any required time to visit the site and become thoroughly familiar with existing and new construction to insure concealment of conduit and recess mounting of devices, as specified.
- K. The contractor shall include any required engineering and coordination with the Software House representatives responsible for maintenance and service to the existing CRL systems.
- L. In some special cases, devices occur in hung or suspended ceilings with lay-in or limited access spline ceilings, and are not to be located in the tile centers, but in accordance with an alignment of other trade items which define an imaginary architectural grid line. Refer to the Architectural Drawings for locations of tile centering or grid alignment.

### 3.3 CONTRACTOR'S ENGINEERING AND DESIGN RESPONSIBILITIES

- A. The contractor shall include adequate time and technical engineering expertise to refine and complete the final design aspects of the installation to reflect the specific requirements of each piece of equipment and subsystem to be utilized as part of the system installation.
- B. As a result of the contractor's engineering and system integration design, if it is determined that additional equipment is required beyond that shown on the drawings or called for in the specifications, such shall be provided at no additional cost. It is not the City of New York's or engineers' intent to require the contractor to increase the quantity of detection, reporting, surveillance, communication or access control applications, but rather to insure that variances in manufacturer's products, substitution of equipment or superseding of equipment by manufacturer's distributors or the system integrator are not responsible for the system's equipment shown from working in a manner that does not fully utilize their published performance criteria. If additional or larger power supplies, relays, zone expander modules, software, line drivers, amplifiers or other support components are required, they shall be provided as part of the integrator's installation.
- C. The final required arrangement of conduit and cable sizing and type and routing will be dependent on the approved equipment selected as part of the shop drawing submission process. The Security Contractor is hereby cautioned and instructed to install conduit, wire, in point to point and home run routing and sizing in accordance with the approved conduit and wire drawings submitted jointly by the Electrical and Security Contractors. The selection of back boxes, extension rings and cover plates for device mounting shall be installed per these same criteria.
- D. The Contractor is required to read the Specifications covering all aspects of the work and will be held responsible for coordination of his work with work performed under all other contracts
- E. Building security and access control system shall comply with the rules and regulations of the local Building Code, and as required for all government approvals.
- F. All systems are to be factory engineered to provide the functions described herein and as provided by the capabilities of the products specified in Part 2.00 of these Specifications.
- G. All calculations and drawings shall be furnished by the Contractor for this system, which shall meet the requirements of approving and listing agencies, the Commissioner or his designee.
- H. The Security System Contractor shall include in his Bid the cost for factory engineering and field tests to verify design calculations and system performance as required for approvals.
- I. If the Contractor has any questions concerning the Plans and Specifications, he is to contact the Commissioner in writing, for clarification prior to bid, to fully understand the extent and responsibilities of his work.

- J. The Contractor's security system design submission shall be based on calculations, which provide for the proper functioning of all devices shown on the drawings and functions as specified herein.
- K. The Security System Contractor is responsible for locating all ceiling mounted detection devices in all suspended or other type ceilings, in accordance with the Architectural Reflected Ceiling Plans. This Contractor shall also refer to Architectural Reflected Ceiling Plans for locations of other trade items in ceiling systems where shown. As above, for wall-mounted equipment, refer to Architectural Interior and Exterior Elevations.
- L. In some special cases, devices occur in hung or suspended ceilings with lay-in or limited access spline ceilings, and are not to be located in the tile centers, but in accordance with an alignment of other trade items which define an imaginary architectural grid line. Refer to the Architectural Drawings for locations of tile centering or grid alignment.

### 3.4 CABLE PATHWAYS AND WIRING

- A. All necessary and incidental wiring associated with the Security System shall be by this Contractor.
- B. Provide all equipment, pathways, outlet boxes, grounding and cabling for a completely installed operating system. However, it is the responsibility of the Security Contractor under this Section to review the drawings and specifications and to provide all equipment, pathways, outlet boxes, grounding and cabling for a completely installed operating system.
- C. Cable-bending radius shall not be less than minimum required by EIA/TIA and BICSI.
- D. Cabling installed concealed shall be supported from the building structure (e.g. cable trays, J-Hooks, snake tray, etc.).
- E. The Contractor shall be responsible for testing and verification that the entire building structure is free from EMI/RFI interference factors prior to installation of unshielded twisted pair station cabling. Voice and data security cabling should not be run adjacent and parallel to power cabling-even along short distances-unless one or both cable types are shielded and grounded. In general, security cabling shall be routed separately, or several feet away from power cabling. Similarly, security cabling shall be routed away from large motors, generators, induction heaters, arc welders, x-ray equipment, and radio frequency, microwave or radar sources.
  - 1. (9 ft.) from transformers
  - 2. (6 ft.) from motors
  - 3. (3 ft.) from conduit and cables used for electrical power distribution
  - 4. (2 ft.) from any power line over 5 Kva

5. (5 in) from fluorescent lighting fixture. Pathways should cross perpendicular to fluorescent lighting fixture and electrical power cables or conduits
  
- F. Cables shall be installed no closer than 12 inches (305mm) to electrical equipment and wiring. When cables are required to cross-power wiring, they shall only do so perpendicular to the power wiring. Telecommunications-cabling and power-wiring shall only cross each other the minimal number of times as required due to building design limitations.
  
- G. Provide expansion fittings and adequate cable slack at all building expansion joints.
  
- H. Slack cable at all equipment racks.
  1. Provide a minimum of ten (10) feet of slack (low voltage & high voltage cables) for all cables entering an equipment rack
  
  2. All low voltage cables entering rack shall be bundled into a single cable bundle.
  
  3. This shall allow for:
    - a. Ease of service/troubleshooting of each equipment rack.
  
    - b. Relocation of equipment to other racks.
  
    - c. Etc.
  
- I. Contractors shall not run any cabling or pathways through elevator shafts, elevator machine room, stair tower enclosures unless these cabling or pathway systems serve the space.
  
- J. Wiring to provide all 120/220 Security VAC sources and points of connection to same shall be by the Electrical Contractor, as shown on the electrical drawings. This contractor to provide 120/220 VAC connections from Electrical Contractor termination points, J-Box, , etc., to security device.
  
- K. All wiring, including low voltage power, voice, signal and data communication, shall be installed in approved metal raceway as required and as shown on the Drawings. All wiring, conduit and installation shall be in accordance with the latest edition of the National Electrical Code, especially article 725, with conduit fill requirements as though system wiring were 120VAC, (40% conduit fill) and the requirements of Division 26, Electrical Specifications. Up-size conduits from sizes shown on drawings, as necessary not to exceed 40% fill criteria. All conduit shall be  $\frac{3}{4}$ " minimum unless otherwise noted in the drawings.
  
- L. Insure cabling shield does not touch terminal connections. Provide "one-end" ground on all shields using drain wires at control panels, power supplies, or head end equipment, then to separate and dedicated RF ground via #8 AWG copper cable. Insulate shield at device end with shrink tubing to completely cover shield and drain wire. Where the same-shielded cable

serves multiple devices, shield continuity shall be maintained and properly insulated to eliminate intermittent grounding. Do not bring shield grounds to a building electrical ground. Carefully follow manufacturer's instructions and advise Engineer accordingly. Shield grounds shall be treated as specified herein unless prohibited by manufacturers.

- M. Lay out conduit and cable runs with Electrical Contractor and Construction Manager, prior to installation, and maintain 1'-0" clearance from parallel runs with 120VAC or larger voltage conduit and wiring. Cross 120VAC or larger voltage conduit runs at 90° to reduce EMI and RF induction in security wiring
- N. All wires shall be color coded to provide separate identification of intrusion alarm signal, 12 VDC, 24 VAC, intercom or CA/IDS system data communication, card access, lock power, video signal, CCTV alarm input, zone expansion or relay board power and data bus or any other system function. Wires shall be similarly coded for each system serviced throughout the entire installation.
- O. All resistors shall be solder connected or double crimp connected to eliminate any additional circuit resistance. Wires connected to resistors shall be solder-tinned to insure positive solder connection or crimp connection. Resistors shall be insulated with shrink tubing extending a minimum of 1" to either side of the resistor. (Unless factory installed and potted as part of magnetic contact construction).
- P. No intermediate cable splices are allowed without the specific written approval of the Engineer. Request clarification and approval prior to installation of any splices.
- Q. All alarm circuits shall be tagged at the device end and field multiplex control panel end with alarm panel or zone addressing module hardware circuit terminal address numbers.
- R. Transformers and power supplies shall be identified, along with their cable, at both transformer and load fed end of cable.
- S. Each card reader access control system cable shall be tagged at both the device and access control field multiplex panel end with the door opening number and device type (i.e. card reader/keypad, electric lock, REX input, etc.).
- T. All CCTV cabling shall be labeled with tags at the camera and control end with corresponding numbers. Patch cords between equipment shall be labeled, wherever possible, with field equipment label designations, to create as uniform a tagging system as possible.
- U. All 12VDC power circuits shall be tagged at each device and 12VDC power supply fused terminal strip with 12VDC panel and fused circuit number.
- V. All power cables shall be tagged at the device end and power panel end with matching numbers.
- W. All wiring in panels shall be neatly dressed, run parallel and in 90° angles wherever possible, and provided with adequate slack for future maintenance and service terminations.

- X. All "unused" wire conductors shall be insulated to eliminate shorts and grounds, tagged with their terminal points and identified as "spare" at each end with a unique spare cable tag identification system
  
- Y. Minor deviations (relocations) in wire runs to installed mounting locations may be required prior to final acceptance when site conditions affect the equipment's operation, performance, or purpose. Relocations which require only minimal work (plus or minus 15') and/or materials shall be made without additional cost or credit.
  
- Z. The Contractor shall note that connection of alarm zone circuits to the intrusion detection panels will require the installation of end-of-line resistors in each zone circuit. Locate as close to the device as possible to provide as much circuit supervision as possible. EOL resistors shall not be located at the panel for active security circuits. All unused zones shall have the end-of-line resistor mounted in the panel if manufacturers' requirements so dictate. Where end-of-line resistors are to be mounted at devices that are factory sealed and have factory configured wire leads, the resistor shall be spliced in-line with the leads as close to the device as possible (splices shall be soldered and covered with heat shrink tubing as specified elsewhere in these specifications).
  
- AA. The Contractor shall install panel cover-operated tamper switches in each equipment enclosure, cabinet, housing, to actuate an alarm signal before access to equipment wiring within the enclosure is gained. Tamper switch mounting hardware shall be concealed so that the location of the switch cannot be visually detected from the exterior of the enclosure. These circuits shall be supervised.
  
- BB. All wiring or cabling shall be tested for, and be free of, opens and shorts. All wiring shall test free of grounds with the exception of circuits that are intended to be connected to the groundside of protective circuits.
  
- CC. All wire and cables entering equipment cabinets and enclosures shall be grouped and tied inside the enclosures on 6-inch centers with self-locking nylon cable ties. All wiring shall be grouped in an orderly fashion. Under no circumstances is the use of adhesive tapes (electrical or other) permitted for either permanent or temporary ties or wire management.
  
- DD. All stranded wiring that is connected to equipment that has terminal strips or screw lugs shall be terminated with either nylon insulated crimp-on spade lugs, equal to Thomas & Betts STA-KON fork tongue locking type or equivalent, sized for correct wire and screw sizes or shall be solid bare wire attached to screw terminals. Where compression screws are used to cap wiring, wiring shall be tinned to eliminate destranding and consequent poor connection. Each spade lug or wire shall be marked with a self-sticking numbered wire marker and documented on the As-Built wiring diagrams.
  
- EE. All wiring that is connected to equipment with solder lug connectors shall terminate wire to lug in a solder joint. The solder joint, lug and any bare wire shall be covered with heat shrink tubing. Multi-conductor bare wire ends shall be soldered to prevent de-stranding.

- FF. Labeling procedure shall meet EIA/TIA Series standard and BICSI Standards and shall be pre-approved by the Commissioner. Hand-written and embossed-type labels are specifically prohibited.
- GG. Permanently label, using pre-printed labels, all cables and terminations.
  - 1 Label the cable segments as indicated on Drawing Schedules. Each outlet/device will be designated by the incoming cable, and will be labeled accordingly.
- HH. Each wire and cable shall be clearly marked within each enclosure, junction box, or where termination is made. Wires and cables shall be marked with a clear, heat-shrink system such as "Shrink Mark" or equivalent, labeling system as manufactured by Raychem. Cable numbers shall be generated on a PC. Felt-tip "Sharpie" type pen markings are unacceptable. Marking documentation shall be included with the detailed wiring diagram to be provided to the City of New York on completion of the installation as part of the As-Built documentation in the "Project Manuals."
- II. Wiring and cables that are installed shall maintain color-coding from origination point to termination point. Where paired cable is used, the pairs in the cable shall be maintained in the run. Pairs shall not be separated to form different pairs than those in the original cable. Color-coding shall be maintained within the system. Maintaining color-coding applies to all type circuits in the system.
- JJ. Review wiring type, scheme and tagging for all systems prior to installation, with factory/technical representatives. Advise the engineer of any required modifications prior to wire procurement and installation and obtain approval accordingly. It is the contractor's responsibility to review the system's wiring with the factory representatives and supply the cables, which meet their requirements. Where heavier gauge cables are specified by the engineer and such provide enhanced performance reliability, durability or future capacity, they shall be used unless prohibited by the manufacturer.
- KK. Paralleling of multi-conductor cables to "create" a cable of larger wire gauge is prohibited, except at doorframe power transfer hinges.
- LL. Wiring diagrams shall be provided in all signal and power panels along with cable schedules, in a clear plastic envelope, for future use in system maintenance and service.
- MM. Run electric lock power circuits so that each electrified locking door opening is wired on its own wire pair to a dedicated fused circuit in the lock power supply.
- NN. Connect no more than five (5) 12VDC security or rex devices to a single pair of 12VDC power wires without the engineer's approval. Terminate these 12VDC power circuits on a dedicated fused outlet in the 12VDC power supply.

### 3.4 MANUALS

- A. Contractor shall carefully complete, during progress of work, operation and maintenance manuals to include methods of care and cleaning of all types of visible surface materials both interior and exterior, and descriptions of all systems and equipment and methods of operation thereof. Descriptions shall give system overview report, pertinent diagrams, identifying charts, color coding, connections, lubricating instructions, programming sequences and constraints, programming values, data base development routines, loaded database file information/ data, and single-line and detailed wiring diagrams.
- B. Use manufacturer's printed information where possible; otherwise obtain written instructions prepared by the installer. Include names, addresses and telephone numbers of all service firms for each item, for the City of New York's use after expiration of guarantee period.
- C. Contractor shall provide manuals describing in detail the operations of all components of system. Such manual shall be adequate in detail to serve as an operator's handbook to guide and instruct operators in all set-ups, programming, database entry, automatic and manual operations of equipment.
- D. These manuals shall contain full support documentation, which shall include, without being limited to the following overview of system:
1. General description and specifications.
  2. Installation and initial checkout procedures, available to the City of New York's staff.
  3. Principles and theory of operation.
  4. Detailed electrical and logical description.
  5. Complete trouble-shooting procedures, diagrams, and guidelines within User's capabilities.
  6. Complete alignment and calibration procedures for all components.
  7. Preventive maintenance requirements.
  8. Detailed schematics and assembly drawings.
  9. Interface requirements and capabilities.
  10. Signal identification and timing diagrams and settings.
  11. User database development instruction and forms.
  12. Programming options and requirements.

13. General Operational.

E. This document shall describe, in laymen, non-engineering terms, all the functional and sequence of operational requirements for the system and its functions that have been established. It shall not require extensive knowledge of electrical engineering techniques or control system theory, or security engineering.

F. System Operation

1. Complete guidance and procedures for operation of the system, including required actions at each operator position, and emergency, alarm, and failure recovery procedures. Systematic instructions for system activation and reset, backup equipment operation, and execution of all system functions and operating modes shall be provided.
2. An operations matrix shall be provided in which all intrusion detection system alarm inputs, and associated relay outputs and other exceptional condition functions are related to all other interfaced sub-system events so that each system event can be logically linked to activation of another system using "if/then" logic in chart form. Matrix shall address field related events, operator initiated events and time-zone events.

G. Functional Description

1. Detailed documentation, in language readily understandable to systems maintenance personnel, the theory of operation, design philosophy, and specific functions of the system. Full details of detection and communication loop components and interfaces, and operator test or self-test of detector/initiating integrity for all system components and peripherals during each system function and operating mode shall be provided. Hardware functions, system component interfaces, and requirements shall be explicitly detailed for all system components in all system functions and operating modes.
2. Person-equipment interactions shall be functionally described as required to supplement data called for in the preceding paragraph in providing a complete system description. Known or established constraints on system operation shall be fully described. Any operating procedures currently implemented or planned for implementation in an automatic or manual mode shall be stated and described.

H. Maintenance

1. Documentation of all user-performed maintenance on all system components including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective units. This shall include calibration, maintenance, and repair of all components and controls, plus diagnosis and repair or replacement of all system hardware, and software, not part of the Installer's standard service contracts.

2. Contractor shall complete as-built documentation manuals to include descriptions of all conduit, trough, and of any other raceway systems and equipment and methods of installation.
3. A special documentation Section shall outline all dragline and box labeling to assist in the installation of any future equipment by a security contractor.
4. Contractor shall provide manuals describing in detail the operations of all components of all systems. Such manuals shall be adequate in detail to serve as an operator's handbook to guide and instruct operators in all automatic and manual operations of equipment, and to provide adequate detail to allow basic system maintenance diagnostics and testing so that only essential service call back by the Installer is required. They shall include all programming values, access codes, alarm transmission formats, default codes, and output relay trip programming and system database loading of all on-site programmable equipment. These manuals shall be assembled and written specifically for this job. Include these manuals as a part of the final turnover "Project Manual". Also, follow requirements of Section 3.07 of this Specification,
5. Include names, addresses and telephone numbers of all component manufacturers or dealers, and of service firms for each item, for City of New York's use after expiration of guarantee period.

### 3.5 KEYS

- A. The Contractor shall furnish a minimum of four keys for each lock on each piece of equipment or for each key switch. The Contractor shall exercise every precaution to protect the security of these keys. Upon completion of the work, the keys shall be properly identified, tagged, and delivered to the City of New York's representative, and a written receipt obtained.
- B. Enclosures of identical equipment shall be keyed alike.

### 3.6 PROGRAMMING

- A. The Security Contractor shall be responsible for programming the entire security system and all subsystems to provide complete operation and monitoring as specified herein and/or as clarified by the City of New York's security department.
- B. The Security Contractor shall provide an initial programming setup in accordance with the Security Specifications, and a second "re-programming" session to fine-tune the system to each of the security department's requirements after an initial use period of two months. The City of New York's security departments shall provide a written list to the Security Contractor with the desired system and subsystem programming modifications, additions, deletions, etc. The Security Contractor shall include a maximum of 25% of the system programming to be included in re-programming.

- C. The Security Contractor shall request programming information relating to response instructions, zone numbers, and any/all special programming information. The request shall be in writing to the City of New York's representative four weeks prior to commencement of programming the system. In the letter, the Security Contractor shall provide descriptive information of the available options and what can be reported by the system for each device, and identify all required questions which the City of New York must respond to in order to complete system's programming.
- D. The Security Contractor shall request programming information relating to response instructions, zone numbers, and any/all special programming information. The request shall be in writing to the City of New York's representative, six months prior to commencement of programming the system. In the letter, the Security Contractor shall provide descriptive information of what is to be reported by the system for each device, and identify all required questions which the City of New York must respond to in order to complete system's programming
- E. The Security Contractor shall load the Project database for the security department, as called out above. System testing shall include coordination and complete testing of each of the individual security system's operating programs and their interface with one another. The Security Contractor shall provide all the necessary database loading forms and informational requirements, a database loading/ creation manual, and five (5) four (4)-hour sessions to work with the City of New York in database information development and use of manuals and forms. This is in addition to the training requirements.
- F. The Security Contractor shall create the access card badge template along with the programming of all cards specified, off site, as part of base bid, and shall verify pricing of card lots of 100.
1. When creating the access cards, special attention needs to be given to the coordination of the programming, layout, printing and any applicable 3rd party integrations with both the client and/or 3rd party representatives.
- G. The Security Contractor shall provide a hard copy back-up database and two electronic copies for all systems and subsystems, including but not limited to, alarm system monitoring, access control system, video badging, emergency communication and CCTV subsystems
- H. The Security Contractor shall provide complete integration programming of the ISMS, and this shall include, but not be limited to:
1. Closed Circuit Television System:
- a. Input of all recording equipment inputs and outputs as individual addresses.
- b. Interface camera call-up to any monitor or individual raster of a multiplexed monitor by alarm device or access control system device.
- c. Obtaining AutoCAD security floor plans and modifying/simplifying and providing interactive security device templates through a maps loaded program.

- d. Provide and program interactive CCTV and all alarm initiating devices, on graphic maps. Program complete graphic user interface (GUI) for CCTV system.
- e. Complete interface with access control system, alarm point monitoring system, graphic maps and with other security systems and subsystems, as called out in the specifications and as shown on the drawings.

2. Access Control System:

- a. End user defined fields, as allowed by the access control system software package for each alarm input, time zone, character fields, data fields, clearance fields, facility codes, expiration dates, names, user codes, etc.
- b. Obtaining AutoCAD security floor plans and modifying/simplifying and providing interactive security device templates through a maps loaded program (Only if not accomplished through CCTV system. If accomplished through CCTV system, complete interface with CCTV system and maps/GUI and all other subsystems).
- c. Obtaining all database information from respective security department and providing detailed assistance to the respective security departments for database creation and all applicable options.
- d. Obtaining specific instructions for each alarm or passive event from the security department and input into system in all appropriate locations. Provide up to 3 instruction sets for each event. (Daytime, nighttime, holiday/weekend).
- e. Program all time zones for all access control devices and cards.
- f. Provide complete interface with CCTV and other programmable subsystems.

3.7 SCOPE OF WORK – SPECIFIC SYSTEM INSTALLATION CRITERIA

A. Magnetic Contact Switches

- 1. Install at selected interior, perimeter doors, and roll-up doors and grilles per manufacturer's instructions, these specifications, and as shown on the Drawings.
- 2. Switches installed at each location shall be a unique designated reporting security zone and be wired to their respective IDS/CA remote input field multiplex panel to individually report which zone is to be armed or disarmed by the appropriate system keypad commands or software time zone control.

3. Magnetic contact system to be fully supervised for circuit open, short, normal, and alarm. Provide required end-of-line resistors as required by ACS manufacturer to achieve this supervision.
4. Switches to be recess/flush mounted to conceal all elements of switch and wiring wherever possible. Rolling doors and grilles only shall utilize surface mounted contacts. This holds true for new and existing doors, except doors which are all glass and have no door frame.
5. One pair required per door leaf. See Security Drawings, for locations and details.
6. Coordinate all door, frame, or other preparation with appropriate Contractors for general construction. New frames must be factory prepared to receive contacts by Security System Contractor and shall be coordinated to achieve exact preparation details per manufacturer's installation instructions.
7. For existing conditions, field drill doors under the supervision of the Commissioner or his designee and the General Contractor.
8. Connect to IDS/CA field multiplex panel for device status signal transmission, and provide one end ground of cable shield at the panel.
9. Prepare aluminum doors and frames to receive magnetic contacts to match recessed hollow metal locational details if material geometry allows.
10. Magnetic contacts shall be typically placed at the door head. Jamb mounting of contact on strike side of single doors is also acceptable, based on field conditions. Mounting of contacts of the hinge side is prohibited.
11. Door contact wiring shall be spliced to homerun signal wiring in door buck junction box, or through purchase of suitable length contact wire, in stainless steel sheathing, to remote junction box, based on field conditions associated with door contact mounting details. Purchase contacts with sufficient armor clad wire and lead length to reach associated junction box with no intermediate splices. Mount associated junction box in or above ceiling or in wall in protected space as directed by the Commissioner or his designee. Wherever an accessible ceiling is provided, mount J-box above ceiling. Where drywall ceilings exist, mount J-box with flush, single gang cover at location agreed to by the Commissioner. Use tamper proof screws where fasteners required and exposed.
12. Use suitable rubber bush compression fittings to secure miniature armor clad door contact cable entry to junction box if used, per Article 10 above.
13. Installation of contacts in special conditions at door frames shall be reviewed in the field and a sample installation of each typical condition shall be created in a working session between Contractors, Commissioner or his designee, prior to final installation.
14. Silicone/RTV glue-in all flush mount where button-type contacts in hollow metal and aluminum frames are allowed. Insure adequate clearance exists between contact mounting, flanges and door and frame. Advise the Construction Manager and Commissioner whenever inadequate clearances exist.

B. Volumetric Motion Detection System

1. Install system of motion detection by locating devices as shown on the Drawings to achieve coverage of those areas.
2. Install passive infrared technology units in designated applications and select appropriate lens optics to provide best coverage, based on locations shown on the drawings and in accordance with manufacturer's instructions.
3. Each device shall constitute a unique zone or portion of a single zone of motion detection. Detectors shall be wired to the IDS/CA field multiplex panel, and capable

of being armed and disarmed by the appropriate system keypad commands or system software time zone control.

4. Placement of motion detector units to be adjusted, if required, from Drawing locations to eliminate "holes" in coverage. Resubmit locations for approval, and discuss layout with the Commissioner or his designee before roughing-in of devices and/or back boxes and commencing of work. Placement of detectors is critical for operation, appearance, maintenance and service.
5. Exact dimensional placement of detection devices in all locations to be site approved if present location provides inappropriate coverage, as per Paragraph 4. above, or because of the substitution of another manufacturer or model number of detector, or if Architectural Reflected Ceiling Plan or interior elevation requires relocation of device to a more suitable location.
6. Provide appropriate 12VDC power for the specified units, in circuits as shown on the Security Drawings. Do not connect more than five, 12VDC security devices on any 12 VDC power supply fused circuit.
7. Mount all units as shown on the Security System Floor Plans, approved shop drawing details, jobsite conditions, and as per manufacturer's recommendations. Unusual detection coverage circumstances shall be solved via site-developed details with the Commissioner on-site prior to commencement of work. Propose alternate manufacturer and model number device to achieve better coverage or more reliable detection if required. Review the model numbers of detectors specified with the Commissioner on a location by location basis prior to procurement.
8. Wire each detection zone with 2 wires for signal, and 2 separate conductors for detector power per cable specifications. 12VDC power circuit may be shared with other security devices other than hold up/panic devices to accommodate "power kill" reset circuits for those devices. (See Article 6 above.) Contractor to verify loading requirements of individual fused outputs from 12 VDC power supply to insure compliance with specifications.
9. Wire any Form "C" alarm relay contacts as NC to open on alarm activation.
10. Alarm circuit to be fully supervised for open, short, normal and alarm. Provide end-of-line resistors at (preferably within) the device as necessary to achieve this supervision per manufacturer's instructions, and connect alarm signal circuits to IDS/CA panel accordingly.
11. Affix detector onto raceway system device back box for connection to cable system. Review backbox and extension ring requirements prior to rough-in work to coordinate device mounting criteria and requirements of finished wall and ceiling construction, to achieve recess or semi-flush mounting wherever possible.

C. Duress Alarm System

1. Furnish and install duress alarm devices as shown on the Drawings, and as coordinated with final architectural millwork details and millwork shop drawings.
2. Wire alarm signal circuit using two-conductor twisted, shielded cable per cable specifications. Specified device contains latching L.E.D. Run additional two-conductor cable, dedicated to duress system, 12VDC power, per cable specifications, to power supply.
3. Each hardwired duress alarm system device shall be wired to the IDS/CA field multiplex panels as separate 24 hour security zones.
4. Duress devices associated alarm signal circuitry to be fully supervised for open, short, normal and alarm. Provide required end-of-line resistors to achieve this supervision per manufacturer's specifications. Locate as close to device as possible, preferably in device homerun junction box. Protect wires from button to junction box using miniature Greenfield/stainless steel sheathing.

5. Provide separate 12 VDC, power kill, LED reset switch in security device low voltage power supply cabinet enclosure, and wire duress device LED power through switch. Label switch accordingly.

D. 12/24 VDC Security Device Low Voltage Power Supplies

1. Install in locations shown on Drawings at SDF's adjacent to other power supply panels, card access field multiplex panels, CCTV power supplies, etc., and connect to security devices per floor plan notes and riser details, manufacturer recommendations and device installation specifications.
2. Hard wire into 120VAC source provided by Electrical Contractor. Wire loss of "AC" power relay and low battery relay in panel enclosure, and connect as separate alarm zones to card access field multiplex panel using end-of-line resistors.
3. Wire from 12VDC individually fused terminals to 12VDC security device power circuits. Do not exceed 200 milliamps of connected load to any one fused circuit. Do not exceed 90% of overall power supply power output rating.
4. Check to assure charging circuits and power supply module is operating, producing proper "on-battery" current, proper output voltage at load, and does not exceed advertised ripple, and that power supervision relays change state. Battery back-up shall be 8 hour minimum at full load. Calculate number of 12 VDC powered devices per 12 VDC circuit, and number of circuits per power supply. Assume all devices in normal state (largest current draw), and systems back up time capability present under this heaviest device load condition.

Provide additional batteries in separate, externally protected, enclosure as required.

5. Mount to provide 3'-0" clear in front of enclosure doors, and provide tamper switch on doors wired to card access field multiplex panel as tamper switch zone via end-of-line resistors.
6. Tag all 12VDC circuits with panel and 12VDC circuit number at both devices and at power supply fuse strip.
7. Wire out to 12 VDC devices using twisted, shielded, unique color-coded cable per specifications.
8. Wire 12VDC duress circuits through separate local to panel, "reset" buttons to kill power to latching LED's and therefore provide remote reset function from each 12 VDC power supply at the SDF location.
9. Unit shall be UL listed, MEA approved, and come complete in enclosure with batteries, lock, tamper switch, loss of AC relay, low battery monitoring, fused output circuits, etc.
10. Activation of power kill switch shall initiate a "trouble" input to the ACS field multiplex panel to indicate a protective circuit is temporarily disabled.

E. 120 VAC Interconnects

1. All remote CCTV camera power supplies video distribution amplifiers, remote monitors and Vid Quad units shall be powered from 120VAC power circuits on the same phase.
2. The security/equipment room CCTV video multiplexers, monitors, matrix switcher, VCR, and video distribution amplifiers and printer shall be fed by the UPS via power outlet strips within the console, and on the same phase as CCTV equipment in item 1 above.
3. The security equipment room IDS/CA system monitors and printers shall be fed off dedicated 120 VAC UPS circuits, via power outlet strips within the console and at the Security Manager's desk, as shown on the electrical drawings.

4. The field located IDS/CA system panels at SDF's shall be powered off dedicated 120 emergency VAC circuits provide 120VAC surge suppression in front of each field multiplex panel shown on the drawings.
5. All electrified door locks' transformers and/or power supplies shall be fed off 120 VAC circuits as shown on the electrical drawings.
6. The Security Contractor shall provide commercial/industrial quality surge suppression devices between the 120VAC normal power and each security system field multiplex device or operator IDS/CA terminal requiring 120VAC and not fed by the UPS.
7. No 120 VAC circuit shall be loaded in excess of 70% of its breaker rating and all electrical work shall be in accordance with the latest edition of NEC.
8. 120VAC power connections to the security equipment shall be performed by the security system contractor.

#### F. CCTV System

1. Install as shown on the Drawings and provide all signal, power and video cable to required locations. Required 120VAC power circuits for the CCTV system, UPS and associated accessories are to be provided by the electrical contractor and connected to by the Security Contractor, and, where necessary, stepped down to low voltage, as required, from 120VAC dedicated emergency power circuits on the same phase throughout the project.
2. Hook-up all Security Equipment Room and Security Manager's Office CCTV monitors, multiplexer controls, matrix switcher, VCR, and video printer equipment to 120VAC, UPS, emergency power circuits per Articles F, G and H of this specification section. Include all necessary power connections, wiring, etc. as required for system power-up.
3. Furnish and install dedicated 24 VAC power circuits and video cables to each camera location shown on the Drawings, and connect power to specified cameras at video camera outlet locations. All cables shall be tagged, and terminated at camera end with appropriate connectors. Similarly tag and provide connectors at monitors, PC's, DVR's, power supply, etc.
4. Provide all CCTV PC's, DVR's, VDA's, etc., with grounded 120 VAC plug-in type connections to provide required grounding protection. Provide surge suppressor protected power for all CCTV 120 VAC connections outside the Security Equipment Room and Security Manager's Office.
5. UPS shall provide complete, 120VAC line voltage surge and power outage protection to provide complete isolation and brown out operation of video equipment from surges and spikes due to transient induced voltages on 120 VAC power feed lines for all Security Equipment Room and Security Manager's Office equipment.
6. Coordinate all final camera locations, mounts, lenses and mounting with the Commissioner or his designee before installation, to insure desired coverage, eliminate blooming from light sources, vision obstruction from exit signs, track fixtures, furnishings, etc. Review architectural drawings and security drawings for locational details.
7. Verify all finish surface dimensions and materials and coordinate junction and/or mounting box type and cover with camera mounting bracket accordingly. Review camera mounting back boxes/brackets and cable feeds to camera with the Construction Manager prior to installation of TV outlet backbox to insure adequate blocking is provided for a structurally sound installation and appropriate bracket/housing mounting.
8. The Contractor shall be required to complete field investigation in areas shown for location of cameras in order to resolve viewing/imaging requirements, and make recommendations to Commissioner for camera-appropriate lens setting with variable

focus lenses. Use service-man's monitor to display various scenes viewed based on focal length selection and review, in field, with the Commissioner. Lenses appropriate to desired viewing ranges, shall be identified as described herein and provided and swapped out on an as-needed basis per camera.

9. Factory trained and authorized technicians shall aim, adjust, align, focus and perform all necessary tuning to achieve required viewing image performance.
10. Terminal installation material, such as cable fittings and grounding blocks, shall be broadcast quality to provide firm and safe construction. Where grounding wire, rod, clamps, etc., are used, they shall be selected to conform to pertinent National Electrical Code and local electrical safety specifications.
11. Connectors used to connect coaxial cable to system equipment, shall be of a type that incorporates an integral radiation suppressing sleeve installed with a purpose specific crimping tool. Care shall be taken to insure that the cable is properly prepared and installed to utilize the characteristics of the sleeve. Screw on BNC connectors shall not be utilized. Insure all connectors are tightened firmly together and test for video signal distortion caused by loose connections or terminators. Use Type "BNC" and "F" type connectors to minimize this condition.
12. Insure that no conductive path exists between the shield of the video cable and the chassis of the associated video equipment. Configure all cable connections and video equipment mounting to eliminate ground loop distortion. Add differential ground loop correctors, clamper amplifiers, or other suitable equipment, as required to achieve distortion-free imaging and recording at no additional charge.
13. See CCTV Riser Drawings for overall scope and configuration of CCTV system control and monitor requirements.
14. Engage the services of a factory trained engineer to produce and/or review the monitor and control cable and equipment shop drawings, before their submission for approval. Shop drawings shall contain the signature of a factory-authorized engineer approving final cable arrangements, equipment interconnects, and overall system configuration.
15. Program the DVR's per the City of New York requirements to interface with the CA/IDS alarm system to integrate with and achieve specified output and subsequent video display and recording sequences.
16. The exterior cameras and the exterior housings are to mount on walls and ceiling requiring special attention with respect to locational placement. Provide templates for ceiling and wall construction contractors, to insure proper cut-outs and perfect fit of video outlet back box and cover plate and/or housing. Review options with the Commissioner and select appropriate camera and location, as required.
17. The contractor is cautioned to recognize that video cable runs shall be continuous from the camera to any monitor and control equipment. No intermediate splices are allowed.
18. All exterior hardware, such as shields, nuts, bolts, washers, shims, etc., shall be stainless steel, minimum Grade 8 spec, to provide corrosion resistance and eliminate staining on the exterior of the building.
19. Provide 120V feed RF isolators in 120V feed to camera power supplies if RF noise generates any distortion to camera video signal or image at monitors.
20. Provide hum and transient isolator in video cable ahead of CCTV equipment as required to eliminate potential ground differentials and consequent degradation of video image at monitor.
21. Leave adequate cable slack in future CCTV outlets to allow proper connection of video and 24VAC power cables.

G. Central Alarm Monitoring and IDS/CA Equipment

1. Installation

- a. Install all hubs, fiber converters, terminal servers, RS232 to 485 converters, RS 485 databus and loop controller at locations shown on the Drawings. Coordinate equipment location with final SDF rooms and other security equipment desk locations. Also, coordinate equipment locations in network office and network equipment room. Install to maximize hands-on use and provide maximum maintenance capability. Review maintenance criteria with system manufacturer and site installation requirements to assure proper dimensional clearances, environmental conditions, and user operational capabilities.
- b. Hook-up, hubs, fiber converters, terminal servers, RS232 to 485 converters, modems, operator workstations and printers to 120VAC power fed off UPS circuits via power outlet strips. Connect to fiber optic cables and insure proper connectivity and communication with CRL equipment.
- c. Tie-in all I/O relay control panels, IDS/CA field multiplex panels, Card Reader Interfaces and data communication link wiring from field multiplex panels located at SDF's, PC's, data loop controller and fiber LAN to achieve system monitor/control capabilities.
- d. Connect card access field multiplex panel alarm input ports per specifications and Riser Diagram, and program system database accordingly to achieve camera call-up using PC video control system software, alarm event printing and database/audit trail storage.
- e. Load all operating and applications software and fully test all system functional modules and features, assist the City of New York in the creation of and load the City of New York-provided database information, and create complete, fully operational card access user files for 200 cards and all system alarm points and CCTV matrix switching control as directed by the City of New York or his designee.
- f. Integrate the new NYPL-BL system via Ethernet WAN to the existing CRL CCURE Software House System to achieve a complete and operational system capable of providing CRL monitoring and control of the NYPL-BL system.
- g. Insure system is fully tested prior to turnover to the City of New York. Test shall verify function of PCs, software, Ethernet WAN and field panels, and CCTV matrix switching commands. Provide factory test report to the Commissioner prior to installation of equipment on site.

2. Data Communication Gathering Network

- a. Provide all necessary installation and supervision over connection of data loop converter, and data communication connections to ACP's via Ethernet WAN to CRL site Software House CCURE system.
- b. Configure all connections out to APC's in configuration to match approved manufacturer's data communication interconnect scheme, and provide a means of redundancy in the data loop so that a single break in the loop shall not compromise the functioning of the system. Use identical wire type and color code after verification with equipment manufacturer. Install any required device in the data circuits to achieve complete signal supervision and reporting capabilities as provided by the communication network. Terminate and tag all data communication circuits per manufacturer's instructions so that data communication link is identified at both the controller and remote panel(s) end.
- c. Insure proper cable is utilized to manufacturer's standards. Use a twisted, shielded cable unless specifically prohibited by the manufacturer. Insure continuity of cable shield is maintained and one end ground provided.

- d. Provide single line alarm input, relay output control and card reader termination directories in each APC to achieve proper test, checkout and maintenance. Directories to be encased in clear vinyl envelopes. Number all field wiring screw address points with Security As-Built Drawing ACS zone and card reader number terminations, and panel hardware circuit numbers (manufacturer's terminal address circuit #). Label all panels per appropriate Spec. Section.
3. IDS/CA Field Multiplex Panels (FMP's):
- a. Connect to RS 485 data communications network per manufacturer's instructions in conduit.
  - b. Connect to reader expansion boards and/or card reader interface modules, per manufacturer's instructions if not an integral electronic component of the FMP's architecture.
  - c. Connect to 120VAC circuit, at SDF.
  - d. Program to achieve specified functions.
  - e. Connect tamper switch to alarm monitoring port as an alarm input, utilizing required end-of-line resistors.
  - f. Connect to card reader, door contacts, request to exit devices, electric lock power supply per manufacturer's instructions, and as specified in these specifications.
  - g. Provide loss of AC power and low battery as security zone inputs using relay interface or internal software features.
  - h. Coordinate interface to fire alarm system, where required, to insure that locks identified to be unlocked during a building fire alarm condition are denied power to create an unlocked condition. Furnish and install all conduit and wiring between FMP and fire alarm relays, and lock power supplies as required. Fire alarm "power kill" relays to be wired at SDF, by Electrical Contractor. Logic inputs to the card reader system which initiate software prompted lock release are unacceptable.
  - i. Connect to request to exit devices, which, for electric strike and/or electric panic bars or mortised electric lock equipped doors, shall shunt door alarm contact only. It shall not unlock lock, with the exception of electric deadbolt locks or electromagnetic locks.
  - j. Request-to-exit and request-to-enter pushbuttons shall be provided by this Contractor, where shown on the drawings. The push button shall be programmed to unlock the door and shunt magnetic contacts.
  - k. Field located, Software House Module DC-1 (personality boards) shall not be used.
  - l. Software House equipment may be configured such that their IDS/CA panel has built in reader interfaces or remotely located interfaces. The intent is to have the reader interface electronics installed within the ACP or immediately adjacent to it in an enclosure at the SDF, not at the contact or door/reader location.
  - m. Alarm input circuits shall be end-of-line supervised and shall be wired to end-of-line supervisory modules within the APC.
  - n. Additional supervised alarm input boards shall be provided in order to accommodate all of the alarm input points shown on the floorplan drawings and riser diagrams with a spare capacity of approximately 25%. Spare capacity shall be interpreted to mean the inclusion of the required alarm input boards.



manufacturer's recommended mounting details and adequate physical blocking to insure strong and secure attachment.

6. Ensure extra cable coils are not left in reader backbox where proximity readers are used.
7. Card reader/keypad combination units used for arming and disarming of intrusion zones shall be programmed with the following features.
  1. Shall be programmed to force arm a zone.
  2. Shall be programmed to reset a alarm that has been activated.
  3. Shall be programmed to arm and disarm the system with the use of one code and no special commands.
  4. Shall sound a local audible to signal a entry delay.
  5. Shall be programmed to perform perimeter only arming or complete system arming.
8. IDS/ACS Keypads shall have the following list of commands programmed into them.
  1. \*1\* - Force Arming
  2. \*2\* - Perimeter Only Arming
  3. \*3\* - Zone Bypassing
  4. \*4\* - Duress Alarm

B. Typical SDF Layout

1. Typical Equipment mounted on the 3/4" Plywood Mounting Board includes:
  - a. Field Multiplexer Panel (FMP).
    - 1) Provide with a Tamper Switch and Loss of AC Power Monitoring device. Provide interface to the FMP.
  - b. Security Device – Power Supply
    - 1) Provide with a Tamper Switch and Loss of AC Power Monitoring device. Provide interface to the FMP.
  - c. CCTV Camera – Power Supply
    - 1) Provide with a Tamper Switch and Loss of AC Power Monitoring device. Provide interface to the FMP.
    - 2) Used for other security related equipment cabling as required.

- A. Securely mount stationary consoles, non-castered freestanding racks/equipment cabinets and wall-mounted equipment racks, to the building structure. Equipment racks and cabinets shall be secured to the building structure at the top and bottom of the rack, use manufacturers approve mounting hardware for the applicable application shall be used. Proper quantity of supports shall be utilized. Dry wall screws and other types of supports not specifically approved to support equipment are specifically prohibited. Submit mounting supports for approval before installation.
- B. Position racks, cabinets, and wall-mounted cabinets in order to have minimum three-foot clearance per local and national codes.
- C. Cable Management: Secure the cable bundle(s) to the rack/cabinet/console strain relief and wire management systems in a neat and professional manner. Maintain standards on bundling, supporting, and bend radii.

### 3.9 SEALING OF PENETRATIONS AND OPENINGS

#### A. Environmental Seals

1. Provide outlet plate gasket seals at all outlets on exterior walls and provide non-corrosive plates and fasteners.
2. Silicon seal the button style magnetic contacts.

#### B. Smoke and Fire-Stopping Seals

1. Provide a seal around raceways and/or cables penetrating full height walls (slab to slab), floors or ventilation, or air-handling ducts, so that the spread of fire or products of combustion shall not be substantially increased.
2. Penetrations through fire-resistant-rated walls, partitions, floors or ceilings shall be fire-stopped, using approved methods and NRTL-listed products to maintain the fire-resistance rating.
3. Fire-stopping in sleeves, or in areas having small openings that may require the addition or modification of installed cables or raceways, shall be a soft, pliable, non-hardening fire-stop putty. Putty shall be water-resistant and intumescent.
4. Fire-stopping in locations not likely to require frequent modification shall be a NRTL-listed putty or caulk to meet the required fire-resistance rating.
5. Box penetrations into a fire-rated wall or shaft shall have a fire-stopping pad installed on the back of the box.
6. Fire-stopping of cable trays, ladder racks, and snake trays through walls shall be with NRTL-listed bags to meet the required fire-resistive rating. Fire-stopping of cable trays, ladders, and snake trays through walls will not allow products of combustion to pass through the protected opening. The NRTL-listed bags shall be installed inside, and on both sides of, the opening as required to meet the required fire-resistive rating of the wall.

### 3.10 CABLE SUPPORTS

- A. Provide strain-relief hardware for backbone cables at each floor level as they pass from one floor to the next.
- B. Provide hook-and-loop (Velcro) cable wraps at all panels, equipment racks, and cabinets. Cable ties are specifically prohibited.

### 3.11 CABLE PROTECTION

- A. Provide bushings in all metal studs and the like where cables will pass through for anti-abrasion resistance.
- B. Cables to be installed in existing, enclosed, open bays or furred spaces where conduit stubs are not provided, shall be protected from chafing or from any damage. The Installer shall verify that the warranty shall not be violated before installing any cabling in these locations.
- C. Provide cutting, coring, sleeves, and bushings, and seal as required at all penetrations.
- D. Cables damaged during installation shall not be repaired. They shall be completely replaced with new cable.

### 3.12 GROUNDING

- A. General:
  - 1. The Security Systems, consisting of cable tray, ladder rack, snake tray, equipment cabinets, racks, consoles and non-current carrying metallic parts, shall be grounded according to the National Electrical Code.
  - 2. In general, the grounding shall be as specified, as indicated on the Drawings, and as required by the National Electrical Code and Local Authorities.
- B. Methods:
  - 1. Provide equipment grounding connections for security systems as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.
  - 2. Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.
  - 3. The installer shall provide all necessary transient protection on the AC power feed and on all station lines leaving or entering the building.

4. The installer shall note in his system drawings, the type and location of these protection devices as well as all wiring information.
5. The installer shall furnish and install a dedicated, isolated earth ground from the central equipment rack and bond to the incoming electrical service ground bus bar.

C. Equipment Bonding and Grounding

1. Provide grounding and bonding as required by EIA/TIA-607 standards, codes and the equipment manufacturers.
2. Make final grounding conductor connection to cabinet around bus.
3. Each individual piece of equipment shall have an individual grounding conductor to the ground bus within the cabinet.
4. All equipment shall have bonding jumpers between them (i.e. between cable tray, ladder rack, snake tray and equipment rack, etc.).
5. Equipment integral to an equipment rack (i.e. shelves, panels, cable management, etc.) shall be considered bonded.
6. Equipment that is not integral to an equipment rack (i.e. shelf mounted electronic equipment, cable tray, ladder rack, snake tray, etc.) requires individual bonding jumpers between the equipment and the rack.
7. Properly clean and prepare all surfaces for a complete bonding and grounding termination.
8. Install grounding bus in all equipment racks, consoles and cabinets.

3.13 SLEEVING AND BUSHINGS

- A. Raceways and openings shall be laid out in advance to permit their provision in the work. Sleeves and raceways shall be set before new masonry is constructed. Any extra work required where sleeves or raceways have been omitted or improperly placed shall be performed at the expense of the Installer who made the error or omission, including coring.
  1. Existing Construction: Where raceways and cable pathways must pass vertically through existing construction, coring shall be located as per the guidelines shown on the drawings.
- B. Provide sleeves for raceways, busways, snake trays, and cable trays, ladder rack, penetrating floors, fire walls, or smoke partitions. Install approved material to provide for fire stop.

- C. Provide waterproof seals inside and outside raceway when penetrating from the exterior or underground.

### 3.14 SYSTEMS CABLE TESTING

- A. Cabling systems shall meet or exceed the electrical and transmission characteristics of the systems specified.
- B. Cable segments and links shall be tested from both ends of the cable for each of the construction phases. (Verify that cable labeling matches at both ends).

### 3.15 TRAINING

- A. The Contractor shall be responsible for programming the entire security system to provide complete operation and monitoring as specified herein and/or as clarified by the City of New York.
- B. It is the City of New York's intent to have the contractor provide an initial programming setup in accordance with the Security Specifications, and a second "re-programming" session to fine tune the system to the City of New York's requirements after a short, initial use period (2 weeks).
- C. The Contractor shall load the Project database. The Contractor shall provide all the necessary database loading forms and informational requirements, a database loading/creation manual, and four (4) 4-hour sessions to work with the City of New York in database information development and use of manuals and forms.
- D. The contractor shall create the City of New York IDS/CA card database and create cards accordingly.
- E. The Contractor shall provide a hard copy back-up database for IDS/CA and CCTV sub-systems.

### 3.16 ACCEPTANCE DEMONSTRATION

- A. This work shall include pre-delivery testing of major Security System equipment, field testing and adjustment of all equipment, and an on-site final operational acceptance test of the complete operational system. The Commissioner or his designee shall be advised at least fifteen (15) business days in advance of the dates of all tests. Acceptance of tests witnessed by the Commissioner shall not relieve the Contractor of responsibility for the complete system meeting the requirements of these Specifications after installation.
- B. Prior to the final "Turnover Meeting Acceptance Test", the Contractor shall provide a system "initial check-out" test. Each system component shall be tested alone and for system operation and shown to operate successfully. It is the intent of this test to check out all

systems to establish any system failures or faults prior to the final tests in the presence of the Commissioner or his designee. Manufacturers' requirements, engineers, or factory/dealer support shall be solicited and obtained by the Contractor to insure all systems perform as specified herein and per manufacturers' requirements.

- C. Upon completion of the installation and system "Initial check-out" test, a "Turnover Meeting Acceptance Test" shall be held at the site at which the Commissioner or his designee, the City of New York, system equipment suppliers, and all associated Sub Contractors are present. The manufacturer's representatives shall also be advised and their presence requested in writing for attendance. At this time, a functional test of the entire system and all its components shall be demonstrated, including all aspects of the PAL and CRL interconnect and interactive software.
- D. Functional test shall include all security sub-systems and their components, communication with the CRL site and their equipment, APC alarm monitoring equipment, and any interfaced systems.
- E. Testing procedures set forth in this Specification Section, shall conclusively show that all interfaced device functions are achieved, minimally as follows:
  - 1. All Security detection devices detect and report.
  - 2. IDS/CA system operator terminals, printers, field multiplex panels, WAN interconnect to CRL and software fully functional and operates in accordance with project specific, City of New York-approved and contractor loaded database.
  - 3. Complete operation of battery and standby power systems, including all battery power charging circuits, and proper equipment function of all low voltage power supplies.
  - 4. Complete operation of CCTV system, and its interaction with the IDS/CA/intrusion detection system software.
  - 5. Complete operation of the UPS system.
  - 6. Complete operation of the CRL central station Software House system and its interface to the BL intrusion detection system.
  - 7. Complete operation of the IDS/CA system at NYPL-BL and at the CRL.
  - 8. Complete operation of the local keypad arm/disarm partition status display system, and its interface to the IDS/CA systems.
- F. Prior to gaining approval to conduct final "Turnover meeting acceptance testing", the installing Contractor must provide the Commissioner or his designee with a preliminary test report, (from "Initial check-out" test) enumerating each component of each system tested and showing satisfactory results, as achieved during "initial check-out" test.
- G. After completion of installation, and as part of "Initial check-out" tests, and prior to "Turnover meeting acceptance test", a factory trained technician shall test and certify each system's operation. Test shall also certify that equipment is installed in accordance with approved factory means and methods.
- H. A letter of certification indicating that each system functions and conforms to all specifications herein shall be presented to the Commissioner or his designee prior to "Turnover meeting acceptance test", as part of the "Initial check-out" test documentation.

- I. Prior to "Turnover meeting acceptance test", the Contractor shall provide one complete set of the approved equipment shop drawings and wiring diagrams for use by the Commissioner or his designee during the "Turnover" test process.
- J. In order to facilitate the final "Turnover" meeting test, the Contractor shall prepare "Test Site/Floor Plans" which give the alarm point multiplex panel security zone address of each intrusion detection device, CCTV camera number, card reader circuit address, and each partition component identity of the ACS/IDS systems, so that immediate recognition of device tested and system reaction can be verified as part of the final "turnover" test.
- K. As-Built drawings shall be available during the final turnover meeting test so their accuracy can be verified by the Commissioner.

### 3.17 PROJECT CITY OF NEW YORK COORDINATION

- A. Prior to Substantial Completion of the project and in ample time to address and resolve any coordination issues, request and arrange meetings between the City of New York, City of New York's Vendors and Consultants, Commissioner and General Contractor to discuss the Scope of Work for each system being provided, and the interface required for a fully functional and operational system upon project completion. Initial meetings shall be scheduled three months prior to the scheduled Substantial Completion date, or as soon as Submittals are submitted and reviewed for projects with shorter schedules.
- B. At these meetings, the required interface shall be reviewed with the City of New York, Requests for information required to complete programming or for coordination shall be presented, and system operation and philosophy shall be discussed.
- C. Additional meetings shall be held as requested by any party so that all issues are resolved and with the goal and intent that all systems are fully operational and functional upon project Substantial Completion, and that the responsibility for all components required is clearly established.

### 3.18 CLEANING UP

- A. Upon completion of all work and testing, thoroughly inspect all exposed portions of the installation and completely remove all exposed labels, markings, and foreign material.
- B. The interior of all boxes and cabinets shall be left clean; exposed surfaces shall be cleaned and plated surfaces polished.
- C. Repair damage to finished surfaces resulting from work under this Section.
- D. Remove material and equipment from areas of work and storage areas.
- E. All equipment shall be clean from dirt, dust, and fingerprints prior to final acceptance.

- F. Touch up all damaged pre-finished equipment using materials and methods recommended by the Manufacturer.

### 3.19 PROJECT CLOSEOUT

- A. Provide close-out submittals as required herein, including the following close out submittals.
  - 1. Operation and Maintenance Manuals.
  - 2. Record Drawings.
- B. Specifically detail what is being delivered (description, quantity, and specification section) and shall be dated and signed by firm delivering materials, and by the City of New York's Representative.
- C. Provide record drawings indicating actual cable routing and cable terminations and all required identifiers. Provide one copy mounted in each SDF and the main SDF.
- D. All sketches, drawings, and charts herein are for the purpose of providing for specifications in a simplified format. Errors and omissions in such does not relieve the Subcontractor of the responsibility for providing a fully complete, secure, and properly operating, security system suitable for the intended use. Bidders must obtain a complete set of Project Drawings and Specifications to determine the full scope of work. In case of conflict the Project Drawings and Specifications shall prevail.

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## SECTION 283111

### DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

###### A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Nonsystem smoke detectors.
5. Heat detectors.
6. Notification appliances.
7. Firefighters' two-way telephone communication service.
8. Magnetic door holders.
9. Remote annunciator.
10. Addressable interface device.
11. Digital alarm communicator transmitter.
12. Radio alarm transmitter.
13. System printer.

##### 1.3 DEFINITIONS

- A. LED: Light-emitting diode.
- B. NICET: National Institute for Certification in Engineering Technologies.

##### 1.4 SYSTEM DESCRIPTION

- A. Noncoded, UL-certified addressable system, with multiplexed signal transmission, dedicated to fire-alarm service only.
- B. Noncoded addressable system, with automatic sensitivity control of certain smoke detectors and multiplexed signal transmission, dedicated to fire-alarm service only.

##### 1.5 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

## 1.6 SUBMITTALS

### A. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:
  - a. Trained and certified by manufacturer in fire-alarm system design.
  - b. NICET-certified fire-alarm technician, Level III Level IV minimum.
  - c. Licensed or certified by authorities having jurisdiction.

### B. Product Data: For each type of product indicated.

### C. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
6. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
7. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

### D. Delegated-Design Submittal: For smoke and heat detectors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the detector.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72.

### E. Qualification Data: For qualified Installer.

### F. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

- G. Field quality-control reports.
- H. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
  - 1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
  - 2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
  - 3. Record copy of site-specific software.
  - 4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
    - a. Frequency of testing of installed components.
    - b. Frequency of inspection of installed components.
    - c. Requirements and recommendations related to results of maintenance.
    - d. Manufacturer's user training manuals.
  - 5. Manufacturer's required maintenance related to system warranty requirements.
  - 6. Abbreviated operating instructions for mounting at fire-alarm control unit.
  - 7. Copy of NFPA 25.
- I. Software and Firmware Operational Documentation:
  - 1. Software operating and upgrade manuals.
  - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
  - 3. Device address list.
  - 4. Printout of software application and graphic screens.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II Level III Level IV technician.
- C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL.
- F. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.
- G. NFPA Certification: Obtain certification according to NFPA 72 in the form of a placard by an FMG-approved alarm company.
- H. NFPA Certification: Obtain certification according to NFPA 72 by.

1.8 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by The City of New York or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
  - 1. Notify Commissioner no fewer than two days in advance of proposed interruption of fire-alarm service.
  - 2. Do not proceed with interruption of fire-alarm service without Commissioner's written permission.

1.9 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.10 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning with Substantial Completion, provide software support for two years.
- C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
  - 1. Provide 30 days' notice to The City of New York to allow scheduling and access to system and to allow The City of New York to upgrade computer equipment if necessary.

1.11 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.
  - 2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.
  - 3. Smoke Detectors, Fire Detectors, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
  - 4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but no fewer than 1 unit of each type.
  - 5. Keys and Tools: One extra set for access to locked and tamperproofed components.
  - 6. Audible and Visual Notification Appliances: One of each type installed.
  - 7. Fuses: Two of each type installed in the system.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Comply with NYPL to conform with the proprietary Edwards EST3 system.

### 2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.
2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Duct smoke detectors.
6. Verified automatic alarm operation of smoke detectors.
7. Automatic sprinkler system water flow.
8. Heat detectors in elevator shaft and pit.
9. Fire-extinguishing system operation.
10. Fire standpipe system.

- B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
2. Identify alarm at fire-alarm control unit and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Activate voice/alarm communication system.
7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
8. Activate smoke-control system (smoke management) at firefighter smoke-control system panel.
9. Activate stairwell and elevator-shaft pressurization systems.
10. Close smoke dampers in air ducts of designated air-conditioning duct systems.
11. Recall elevators to primary or alternate recall floors.
12. Activate emergency lighting control.
13. Activate emergency shutoffs for gas and fuel supplies.
14. Record events in the system memory.
15. Record events by the system printer.

- C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Low-air-pressure switch of a dry-pipe sprinkler system.
3. Elevator shunt-trip supervision.

- D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal ac voltage at fire-alarm control unit.
6. Break in standby battery circuitry.

7. Failure of battery charging.
  8. Abnormal position of any switch at fire-alarm control unit or annunciator.
  9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
  10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

## 2.3 FIRE-ALARM CONTROL UNIT

### A. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.
  - a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
  - b. Include a real-time clock for time annotation of events on the event recorder and printer.
2. Addressable initiation devices that communicate device identity and status.
  - a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at fire-alarm control unit.
  - b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.
3. Addressable control circuits for operation of mechanical equipment.

### B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, 1 2 3 line(s) of 40 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

### C. Circuits:

1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class A.
  - a. Initiating Device Circuits: Style D Style E.
  - b. Notification Appliance Circuits: Style Z.
  - c. Signaling Line Circuits: Style 2 Style 5 Style 6 Style 7.
  - d. Install no more than 50 addressable devices on each signaling line circuit.
2. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class B.
  - a. Initiating Device Circuits: Style A Style B Style C.
  - b. Notification Appliance Circuits: Style W Style X Style Y.
  - c. Signaling Line Circuits: Style 0.5 Style 1 Style 3 Style 3.5 Style 4 Style 4.5.
  - d. Install no more than 50 addressable devices on each signaling line circuit.

3. Serial Interfaces: Two RS-232 ports for printers.
- D. Stairwell Pressurization: Provide an output signal using an addressable relay to start the stairwell pressurization system. Signal shall remain on until alarm conditions are cleared and fire-alarm system is reset. Signal shall not stop in response to alarm acknowledge or signal silence commands.
1. Pressurization starts when any alarm is received at fire-alarm control unit.
  2. Alarm signals from smoke detectors at pressurization air supplies have a higher priority than other alarm signals that start the system.
- E. Smoke-Alarm Verification:
1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
  2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector.
  3. Record events by the system printer.
  4. Sound general alarm if the alarm is verified.
  5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.
- F. Notification Appliance Circuit: Operation shall sound in a.
- G. Elevator Recall:
1. Smoke detectors at the following locations shall initiate automatic elevator recall. Alarm-initiating devices, except those listed, shall not start elevator recall.
    - a. Elevator lobby detectors except the lobby detector on the designated floor.
    - b. Smoke detector in elevator machine room.
    - c. Smoke detectors in elevator hoistway.
  2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
  3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
    - a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.
- H. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be not be connected to fire-alarm system.
- I. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.
- J. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

K. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided in a separate cabinet located in the fire command center as a special module that is part of fire-alarm control unit.

1. Indicated number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711 and be listed by an NRTL.
  - a. Allow the application of and evacuation signal to indicated number of zones and, at same time, allow voice paging to the other zones selectively or in any combination.
  - b. Programmable tone and message sequence selection.
  - c. Standard digitally recorded messages for "Evacuation" and "All Clear."
  - d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification appliance circuits of fire-alarm control unit.
2. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

L. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

M. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals supervisory and digital alarm communicator transmitters and digital alarm radio transmitters shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

N. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

1. Batteries: Sealed lead calcium Sealed, valve-regulated, recombinant lead acid Vented, wet-cell pocket, plate nickel cadmium.
2. Duration: minimum twenty-four (24) hours

O. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

## 2.4 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show

visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Single-action mechanism, breaking-glass or plastic-rod pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Double-action mechanism requiring two actions to initiate an alarm, breaking-glass or plastic-rod pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
3. Station Reset: Key- or wrench-operated switch.
4. Indoor Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
5. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

## 2.5 SYSTEM SMOKE DETECTORS

### A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be four two-wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
  - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F per minute.
  - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F.
  - c. Provide multiple levels of detection sensitivity for each sensor.

### B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).

### C. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).

D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6 NONSYSTEM SMOKE DETECTORS

A. Single-Station Smoke Detectors:

1. Comply with UL 217; suitable for NFPA 101, residential occupancies; operating at 120-V ac with 9-V dc battery as the secondary power source. Provide with "low" or "missing" battery chirping-sound device.
2. Auxiliary Relays: One Form C rated at 0.5 A Form A and one Form C, both rated at 0.5 A.
3. Audible Notification Appliance: Piezoelectric sounder rated at 90 dBA at 10 feet according to UL 464.
4. Visible Notification Appliance: 177-cd strobe.
5. Heat sensor, 135 deg F combination rate-of-rise and fixed temperature.
6. Test Switch: Push to test; simulates smoke at rated obscuration.
7. Tandem Connection: Allow tandem connection of number of indicated detectors; alarm on one detector shall actuate notification on all connected detectors.
8. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
9. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
10. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.

B. Single-Station Duct Smoke Detectors:

1. Comply with UL 268A; operating at 120-V ac.
2. Sensor: LED or infrared light source with matching silicon-cell receiver.
  - a. Detector Sensitivity: Smoke obscuration between 2.5 and 3.5 percent/foot when tested according to UL 268A.
3. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. The fixed base shall be designed for mounting directly to air duct. Provide terminals in the fixed base for connection to building wiring.
  - a. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
5. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.7 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or a rate of rise that exceeds 15 deg F per minute unless otherwise indicated.

1. Mounting: Adapter plate for outlet box mounting Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F.

1. Mounting: Adapter plate for outlet box mounting Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

D. Continuous Linear Heat-Detector System:

1. Detector Cable: Rated detection temperature 155 deg F. NRTL listed for "regular" service and a standard environment. Cable includes two steel actuator wires twisted together with spring pressure, wrapped with protective tape, and finished with PVC outer sheath. Each actuator wire is insulated with heat-sensitive material that reacts with heat to allow the cable twist pressure to short-circuit wires at the location of elevated temperature.
2. Control Unit: Two-zone or multizone unit as indicated. Provide same system power supply, supervision, and alarm features as specified for fire-alarm control unit.
3. Signals to Fire-Alarm Control Unit: Any type of local system trouble shall be reported to fire-alarm control unit as a composite "trouble" signal. Alarms on each detection zone shall be individually reported to central fire-alarm control unit as separately identified zones.

4. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

## 2.8 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.
- B. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.
  1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
- C. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.
- D. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.
- E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.
- F. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- high letters on the lens.
  1. Rated Light Output:
    - a. 15 30 75 110 177 cd.
    - b. 15/30/75/110 cd, selectable in the field.
  2. Mounting: Wall mounted unless otherwise indicated.
  3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
  4. Flashing shall be in a temporal pattern, synchronized with other units.
  5. Strobe Leads: Factory connected to screw terminals.
  6. Mounting Faceplate: Factory finished, red white.
- G. Voice/Tone Notification Appliances:
  1. Appliances shall comply with UL 1480 and shall be listed and labeled by an NRTL.
  2. High-Range Units: Rated 2 to 15 W.
  3. Low-Range Units: Rated 1 to 2 W.
  4. Mounting: Flush semirecessed or surface mounted and bidirectional.
  5. Matching Transformers: Tap range matched to acoustical environment of speaker location.

## 2.9 FIREFIGHTERS' TWO-WAY TELEPHONE COMMUNICATION SERVICE

- A. Dedicated, two-way, supervised, telephone voice communication links between fire-alarm control unit, the fire command center, and remote firefighters' telephone stations. Supervised

telephone lines shall be connected to talk circuits by controls in a control module. Provide the following:

1. Common-talk type for firefighter use only.
2. Selective-talk type for use by firefighters and fire wardens.
3. Controls to disconnect phones from talk circuits if too many phones are in use simultaneously.
4. Audible Pulse and Tone Generator, and High-Intensity Lamp: When a remote telephone is activated, it causes audible signal to sound and high-intensity lamp to flash.
5. Selector panel controls shall provide for simultaneous operation of up to six telephones in selected zones. Indicate ground faults and open or shorted telephone lines on the panel front by individual LEDs.
6. Display: Graphic Liquid-crystal digital to indicate location of caller.
7. Remote Telephone Cabinet: Flush- or surface-mounted cabinet as indicated, factory-standard red finish, with handset.
  - a. Install one-piece handset to cabinet with vandal-resistant armored cord. Silk-screened or engraved label on cabinet door, designating "Fire Warden Phone" or "Fire Emergency Phone."
  - b. With "break-glass" type door access lock.
8. Remote Telephone Jack Stations: Single-gang, stainless-steel-plate mounted plug, engraved "Fire Warden Phone" or "Fire Emergency Phone."
9. Handsets: push-to-talk-type sets with noise-canceling microphone stored in a cabinet adjacent to fire-alarm control unit in the fire command center.

#### 2.10 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
  1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
  2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
  3. Rating: 24-V ac or dc.
  4. Rating: 120-V ac.
- B. Material and Finish: Match door hardware.

#### 2.11 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
  1. Mounting: Flush Surface cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

#### 2.12 ADDRESSABLE INTERFACE DEVICE

- A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

- B. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall to circuit-breaker shunt trip for power shutdown.

#### 2.13 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture one two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
  - 1. Verification that both telephone lines are available.
  - 2. Programming device.
  - 3. LED display.
  - 4. Manual test report function and manual transmission clear indication.
  - 5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
  - 1. Address of the alarm-initiating device.
  - 2. Address Zone of the supervisory signal.
  - 3. Address Zone of the trouble-initiating device.
  - 4. Loss of ac supply or loss of power.
  - 5. Low battery.
  - 6. Abnormal test signal.
  - 7. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

#### 2.14 RADIO ALARM TRANSMITTER

- A. Transmitter shall comply with NFPA 1221 and shall be listed and labeled by an NRTL.
- B. Comply with 47 CFR 90.
- C. Description: Manufacturer's standard commercial product; factory assembled, wired, tested, and ready for installation and operation.
  - 1. Packaging: A single, modular, NEMA 250, Type 1 metal enclosure with a tamper-resistant flush tumbler lock.
  - 2. Signal Transmission Mode and Frequency: VHF or UHF 2-W power output, coordinated with operating characteristics of the established remote alarm receiving station designated by The City of New York.
  - 3. Normal Power Input: 120-V ac.

4. Secondary Power: Integral-sealed, rechargeable, 12-V battery and charger. Comply with NFPA 72 requirements for battery capacity; submit calculations.
5. Antenna: Omnidirectional, coaxial half-wave, dipole type with driving point impedance matched to transmitter and antenna cable output impedance. Wind-load strength of antenna and mounting hardware and supports shall withstand 100 mph with a gust factor of 1.3 without failure.
6. Antenna Cable: Coaxial cable with impedance matched to the transmitter output impedance.
7. Antenna-Cable Connectors: Weatherproof.
8. Alarm Interface Devices: Circuit boards, modules, and other auxiliary devices, integral to the transmitter, matching fire-alarm and other system outputs to message-generating inputs of the transmitter that produce required message transmissions.

D. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit or from its own internal sensors or controls and shall automatically transmit signal along with a unique code that identifies the transmitting station to the remote alarm receiving station. Transmitted messages shall correspond to standard designations for fire-reporting system to which the signal is being transmitted and shall include separately designated messages in response to the following events or conditions:

1. Transmitter Low-Battery Condition: Sent when battery voltage is below 85 percent of rated value.
2. System Test Message: Initiated manually by a test switch within the transmitter cabinet, or automatically at an optionally preselected time, once every 24 hours, with transmission time controlled by a programmed timing device integral to transmitter controls.
3. Transmitter Trouble Message: Actuated by failure, in excess of one-minute duration, of the transmitter normal power source, derangement of the wiring of the transmitter, or any alarm input interface circuit or device connected to it.
4. Local Fire-Alarm-System Trouble Message: Initiated by events or conditions that cause a trouble signal to be indicated on the building system.
5. Local Fire-Alarm-System Alarm Message: Actuated when the building system goes into an alarm state. Identifies device that initiated the alarm.
6. Local Fire-Alarm-System Supervisory-Alarm Message: Actuated when the building alarm system indicates a supervisory alarm.

#### 2.15 SYSTEM PRINTER

- A. Printer shall be listed and labeled by an NRTL as an integral part of fire-alarm system.

#### 2.16 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
  1. Factory fabricated and furnished by manufacturer of device.
  2. Finish: Paint of color to match the protected device.

### PART 3 - EXECUTION

#### 3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72 for installation of fire-alarm equipment.

- B. Equipment Mounting: Install fire-alarm control unit on concrete base with tops of cabinets not more than 72 inches above the finished floor. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete Miscellaneous Cast-in-Place Concrete."
1. Install seismic bracing. Comply with requirements in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
  2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
  3. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  4. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  5. Install anchor bolts to elevations required for proper attachment to supported equipment.
- C. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.
1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
  2. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- D. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
1. Connect new equipment to existing control panel in existing part of the building.
  2. Connect new equipment to existing monitoring equipment at the supervising station.
  3. Expand, modify, and supplement existing control monitoring equipment as necessary to extend existing control monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- E. Smoke- or Heat-Detector Spacing:
1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
  2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
  3. Smooth ceiling spacing shall not exceed 30 feet.
  4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A or Appendix B in NFPA 72.
  5. HVAC: Locate detectors not closer than 3 feet 5 feet from air-supply diffuser or return-air opening.
  6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
- F. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
- G. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

- H. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.
- I. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- J. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
- K. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling.
- L. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- M. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.
- N. Annunciator: Install with top of panel not more than 72 inches above the finished floor.
- O. Antenna for Radio Alarm Transmitter: Mount to building structure where indicated. Use mounting arrangement and substrate connection that will resist 100-mph wind load with a gust factor of 1.3 without damage.

### 3.2 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
  - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
  - 1. Alarm-initiating connection to smoke-control system (smoke management) at firefighter smoke-control system panel.
  - 2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.
  - 3. Smoke dampers in air ducts of designated air-conditioning duct systems.
  - 4. Alarm-initiating connection to elevator recall system and components.
  - 5. Alarm-initiating connection to activate emergency lighting control.
  - 6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
  - 7. Supervisory connections at valve supervisory switches.
  - 8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
  - 9. Supervisory connections at elevator shunt trip breaker.
  - 10. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
  - 11. Supervisory connections at fire-pump engine control panel.

### 3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

### 3.4 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

### 3.5 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by Commissionerauthorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
  - 1. Visual Inspection: Conduct visual inspection prior to testing.
    - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
    - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
  - 2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
  - 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
  - 4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
  - 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
  - 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections.

- G. Prepare test and inspection reports.
- H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train The City of New York 's maintenance personnel to adjust, operate, and maintain fire-alarm system.

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## SECTION 312000

### EARTHWORK

#### PART 1 GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

##### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the earthwork as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:

1. Protection and safeguards.
2. Excavating for footings, foundations and below grade construction for new elevator pit.
3. Excavating for all underground mechanical and electrical utilities.
4. Filling and backfilling to attain indicated grades.
5. Preparation of sub-grade for building slab.
6. Aggregate sub-base below concrete slabs.
7. Dewatering.
8. Shoring and bracing.

##### 1.3 RELATED SECTIONS

- A. Volatile organic compound (VOC) limits for adhesives, sealants, paints and coatings – Section 018419.
- B. Sustainable design requirements (LEED Building) – Section 018113.
- C. Construction waste requirements – Section 017419.
- D. Construction IAQ requirements – Section 018119.
- E. Capillary waterproofing – Section 071610.

##### 1.4 QUALITY ASSURANCE

- A. The City of New York requires the Contractor to implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ Green

Building rating. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in related sections of the contract documents, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the environmental goals.

#### 1.5 SUBMITTALS

A. LEED BUILDING Submittal Requirements: The contractor or subcontractor shall submit the following LEED BUILDING certification items:

1. Material cost breakdowns, submitted in the format of the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, per Section 01000 -1.05: Article D (LEED BUILDING Submittal Requirements) of these specifications.
2. Additional information to complete the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
3. Letters of Certification, Product Cut Sheets, Material Safety Data Sheets, or other items to support the information provided in the ENVIRONMENTAL BUILDING MATERIALS CERTIFICATION FORM, as requested by the Commissioner.
4. Material Safety Data Sheets, for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings. Material Safety Data Sheets shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC limits, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC limits).
5. The LEED BUILDING Submittal information shall be assembled into one package per specification section (or per subcontractor), and sent to the Commissioner for review.

#### 1.6 JOB CONDITIONS

A. Dust Control

1. Use all means necessary to control dust on or near the work.
2. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and performance of other work on the site.

B. Protection

1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

2. Provide the necessary safeguards to prevent accidents, to avoid all unnecessary hazards and protect the public, the work and the property at all times, including Saturdays, Sundays and holidays.
3. Be responsible for any and all damages which may arise or occur to any party whatsoever by reason of the neglect in providing proper lights, guards, barriers, or any other safeguards to prevent damage to property, life and limb.
4. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

C. Existing Underground Utilities

1. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility Owner immediately for directions. Cooperate with City of New York and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
3. Do not interrupt existing utilities serving facilities occupied and used by City of New York or others, except when permitted in writing by the Commissioner and then only after acceptable temporary utility services have been provided.
4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

- D. Explosives: Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

## PART 2 PRODUCTS

### 2.1 ON-SITE MATERIAL

- A. All on-site material to be used as fill shall be soil or soil-rock mixture which is free from organic matter and other deleterious substances. It shall contain no rocks or lumps over two (2) inches in greatest dimension.

### 2.2 AGGREGATE SUB-BASE BELOW SLAB ON GRADE

- A. Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with one-hundred (100) percent passing a 1-1/2" sieve and not more than five (5) percent passing a No. 4 sieve.

## PART 3 EXECUTION

### 3.1 INSPECTION

- A. Examine the areas and conditions where earthwork is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 GENERAL

- A. Familiarization: Prior to all work of this Section, become thoroughly familiar with the site, site conditions, and all portions of the work falling within this Section. Correct any unsatisfactory conditions encountered.
- B. Backfilling Prior to Approvals
  - 1. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to all required inspections and approvals.
  - 2. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the City of New York.
  - 3. After the work has been completely inspected and approved, make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the City of New York.

### 3.3 FINISH ELEVATIONS AND LINES

- A. For setting and establishing layout of building and finish elevations and lines, secure the services of a registered civil engineer or a licensed land surveyor acceptable to the Commissioner. Carefully preserve all data and all monuments set by the civil engineer or surveyor and, if displaced or lost, immediately replace at no additional cost to the City of New York.

### 3.4 EXCAVATION

- A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.
- B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimension without specific direction of Soils Engineer. Unauthorized excavation, as well as remedial work directed by Soils Engineer, shall be at Contractor's expense.
  - 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Soils Engineer.

2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classifications, unless otherwise directed by Soils Engineer.
- C. Additional Excavation: When excavation has reached required subgrade elevations, notify Soils Engineer who will make an inspection of conditions.
1. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by the Soils Engineer. Excavation of unsuitable material must extend laterally beyond the edge of the footing or slab for a distance equal to or greater than the required depth of the excavation.
  2. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.
- D. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- E. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition.
1. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
  2. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
- F. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations. Maintain water levels below base of excavation to control hydrostatic pressure on subgrade soils.
  2. Establish and maintain temporary drainage ditches and other diversion outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
- G. Material Storage: Stockpile satisfactory excavated materials where directed until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

2. Dispose of excess soil material and waste materials not re-used.
- H. Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
1. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.
- I. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than thirty-five (35) degrees F. (1 degree Centigrade).

### 3.5 COMPACTION

- A. Once the design subgrades are established, the filled and the indigenous soils shall be proof-compacted using a smooth drum self propelled vibratory compactor which develops a centrifugal force of at least 40,000 pounds and a frequency of at least 1,200 vpm. The compactor shall complete eight (8) passes across the exposed soil grades to improve their density and uniformity.
- B. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.
- C. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density as determined in accordance with ASTM D 1557.
1. Structures, Building Slabs and Steps, Pavements: Compact each layer of backfill or fill material to ninety-five (95) percent maximum dry density, at + 2% of its optimum moisture content.
- D. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer or soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
    - a. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to within + 2% of its optimum moisture content.

### 3.6 BACKFILL AND FILL

- A. General: Place acceptable soil material in layers to required subgrade elevations for each area classification listed below.

1. In excavations, use satisfactory excavated or borrow material.
  2. Under building slabs, use aggregate subbase material.
  3. Under piping and conduit, use existing subbase material where subbase is indicated under piping or conduit; shape to fit bottom ninety (90) degrees of cylinder.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
  2. Inspection, testing, approval, and recording locations of underground utilities.
  3. Removal of concrete formwork after concrete has attained twenty-eight (28) day design strength.
  4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structure or utilities, or leave in place if required.
  5. Removal of trash and debris.
  6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so that fill material will bond with existing surface.
1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Placement and Compaction: Place backfill and fill materials in layers not more than eight (8) inches in loose depth for material compacted by heavy compaction equipment, and not more than four (4) inches in loose depth for material compacted by hand operated tampers.
1. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
  2. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against

structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

### 3.7 GRADING

- A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- B. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a ten (10) foot straightedge.
- C. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum density for each area classification.

### 3.8 BUILDING SLAB AGGREGATE SUB-BASE COURSE

- A. Placing: Place material on prepared subgrade in layers of uniform thickness, conforming to indicated cross section and thickness. Maintain optimum moisture content for compacting material during placement operations.
- B. When aggregate sub base is shown to be six (6) inches thick or less, place material in a single layer. When shown to be more than six (6) inches thick, place material in equal layers, except no single layer more than six (6) inches or less than three (3) inches in thickness when compacted.

### 3.9 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
  - 1. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### 3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal from City of New York's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off City of New York's property.

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**THE CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF PUBLIC BUILDINGS**

30-30 THOMSON AVENUE                      LONG ISLAND CITY, NEW YORK 11101-3045  
TELEPHONE (718) 391-1000                  WEBSITE [www.nyc.gov/buildnyc](http://www.nyc.gov/buildnyc)

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**Contract for Furnishing all Labor and Material Necessary and Required for:**

**CONTRACT NO. 1            GENERAL CONSTRUCTION WORK**

# **Woodstock Branch Library Renovation and ADA Compliance**

**LOCATION:                      761 East 160th Street  
BOROUGH:                    Bronx 10456  
CITY OF NEW YORK**

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Contractor \_\_\_\_\_

Dated \_\_\_\_\_, 20\_\_\_\_

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Entered in the Comptroller's Office

First Assistant Bookkeeper \_\_\_\_\_

Dated \_\_\_\_\_, 20\_\_\_\_

