



**Everett, WA.  
USPS - SDC**

**8120 Hardeson Road, Everett, WA 98203**

**542774-G03**

**06/16/2023 For Construction**

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Project Manual - Volume 1

SECTION 000002

PROJECT DIRECTORY

ARCHITECT

GPD Group, Professional Corporation  
520 South Main Street, Suite, 2531,  
Akron, Ohio 44311  
Telephone: (216) 927-8665  
Email: dlosh@gpdgroup.com

CIVIL ENGINEER

GPD Group, Professional Corporation  
520 South Main Street, Suite, 2531,  
Akron, Ohio 44311  
Telephone: (330) 572-2217  
Email: mhogston@gpdgroup.com

STRUCTURAL ENGINEER

GPD Group, Professional Corporation  
520 South Main Street, Suite, 2531,  
Akron, Ohio 44311  
Telephone: (330) 572-2203  
Email: cdomer@gpdgroup.com

MECHANICAL ENGINEER

GPD Group, Professional Corporation  
520 South Main Street, Suite, 2531,  
Akron, Ohio 44311  
Telephone: (330) 572-3512  
Email: kbilinski@gpdgroup.com

ELECTRICAL ENGINEER

GPD Group, Professional Corporation  
520 South Main Street, Suite, 2531,  
Akron, Ohio 44311  
Telephone: (330) 572-3630  
Email: jross@gpdgroup.com

CONSTRUCTION MANAGER

PATRIOT CONSTRUCTION MANAGEMENT

44 Grant 65  
Sheridan, Arkansas 72150  
Tony Zircher  
Telephone: (419) 953-3557  
Email: tony.zircher@patriotccm.com

END OF DOCUMENT

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END OF SECTION

USPS MPF Specification

SECTION 011000  
SUMMARY OF WORK

PART 1 - GENERAL

1.1 SCOPE

- A. The Contractor must provide all material, labor, tools, plant, supplies, equipment, transportation, superintendence, temporary construction of every nature, and all other services and facilities necessary to complete the construction of a postal facility for the Postal Service, including all incidental work described in the contract documents.
- B. Project consists of selective demolition related to carrier entrance and path of travel accessing carrier vehicles. Work also includes finish and furnishing updates to carrier related rooms including, but not limited to Restrooms, Break Rooms, Work Floor, and Supervisor Offices. All carrier restrooms will receive one-for-one replacement of fixtures and accessories. The Restroom associated with the Locker Rooms will be made to conform to Accessibility Standards with any required fixture relocations. All exhaust fans will be replaced throughout the building and any additional HVAC updates will be made per building functionality. All noted light fixtures will be replaced with LED. Site work will occur to allow for more parking, better circulation, better lighting and accommodating EV vehicles.
- C. All work shall be in accordance with applicable codes and local regulations that may apply. In case of conflict in or between the Contract Documents and a governing code or ordinance, the more stringent standard shall apply.

1.2 POSTAL SERVICE FURNISHED – CONTRACTOR INSTALLED EQUIPMENT

- A. The Postal Service will furnish to the Contractor the equipment to be incorporated or installed in the work as identified in the Scope, Specifications, and/or drawings.
- B. The Contractor will complete the Postal Service Furnished – Contractor Installed Equipment form found in Attachment A., identifying quantities and desired delivery dates.
- C. Scheduling and installation must be in accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Postal Service Property*.

1.3 MISCELLANEOUS CONTRACT EXPENSES

- A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Permits and Responsibilities* and, *Building Codes, Fees and Charges*, the Contractor must include in its price proposal a separate line item for the cost each of the of the following fees or charges payable to State, local, or special community development agencies:

Water service connection and meter fee	N/A
Electrical company required fees	
Telephone company required fees	N/A
Off-site inspection fees	
Sanitary sewer connection fee	N/A
Environmental Permits/Registrations	
Other permits or fees	
- B. If the actual cost of any item identified above is more or less than the amount listed, the contract price will be adjusted accordingly by a contract modification. The adjustment will not include

overhead and profit. The Contractor must, within 30 days after incurring the expenses, inform the Contracting Officer that the payment has been made. Evidence of the actual amount paid must be provided. The contract amount will be adjusted upward or downward as necessary to accommodate actual charges from the utilities. The Contractor must provide all coordination with the utilities in accomplishing their work and must make all payments to the utilities for their work.

- C. The Contractor must include all additional fees, as required, in the price proposal.

#### 1.4 USPS DIRECT VENDOR EQUIPMENT OR SUPPLIES

- A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning, *Direct Vendor / Pre-selected Sources*, the Contractor is solely responsible for contracting with the Direct Vendor and ordering, payment, receiving, accepting, storage and installation of United States Postal Service Direct Vendor equipment or supplies. Ordering instructions are included in each specification section.
- B. The Contractor will off-load, inspect the delivered equipment, or supplies to make sure they are in good condition, acknowledge receipt, and accept the delivered goods.
- C. Direct Vendor items in this contract are limited to specific items, as shown in the drawings, and listed below:
  - 1. Section 083614 - Sectional Knockout Doors
  - 2. Section 083800 - Traffic Doors
  - 3. Section 101404 - Postal Signage
  - 4. Section 111304 - Dock Lift (Scissors Type)
  - 5. Section 123504 - Postal Casework
  - 6. Section 282305 - Integrated Security and Investigative Platform (ISIP) CCTV System
  - 7. EV Chargers
  - 8. Transformers

#### 1.5 USPS PRE-APPROVED VENDOR EQUIPMENT OR SUPPLIES

- A. The Contractor is solely responsible for contracting with the Pre-Approved Vendor and ordering, payment, receiving, accepting, storage and installation of United States Postal Service Pre-Approved Vendor equipment or supplies. Ordering instructions are included in each specification section.
- B. The Contractor will off-load, inspect the delivered equipment, or supplies to make sure they are in good condition, acknowledge receipt, and accept the delivered goods.
- C. Pre-Approved Vendor items in this contract are limited to specific items, as shown in the drawings, and listed below:

- 1. EV Chargers & Transformers

#### 1.6 MISCELLANEOUS EQUIPMENT CROSS-REFERENCE LIST

- A. The following table is a cross-reference for equipment that may be shown in the drawings. The Contractor is solely responsible for ordering, payment, receiving, accepting, storage and installation of the equipment or supplies as specified in each specification section. USPS Standards for Facility Accessibility Handbook RE-4 supersedes standards in question of conflict.

<b>Equipment Number</b>	<b>Description</b>	<b>Specification Section</b>
E506	Metal Wardrobe Lockers	105113
E511	Fire Extinguisher	104400
E512	Office ladder	124104
E530	Window Blinds	122000

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification



**Postal Service Furnished – [Contractor] Installed Equipment**

Equipment Number	Postal Stock Number (PSN)/eBuy2 Mfr Part No.	Description	Quantity	Desired Delivery Dates	
				After	Before
<b>Security Items</b>					
<b>Retail Items</b>					
<b>Miscellaneous Items</b>					
	None	Impact Cones (mechanization) - See Note 2			
	None	PSDS Cable (linear feet) - See Note 2			
	None	Floor Scale Cable (linear feet) - See Note 2			
	None	10 feet, 61 Conductor Cable, Female Drop - See Note 2			
	None	15 feet, 61 Conductor Cable, Female Drop - See Note 2			
	None	10 feet, 61 Conductor Cable, Male Drop - See Note 2			
	None	15 feet, 61 Conductor Cable, Male Drop - See Note 2			

Postal Service Furnished – [Contractor] Installed Equipment					
Equipment Number	Postal Stock Number (PSN)/eBuy2 Mfr Part No.	Description	Quantity	Desired Delivery Dates	
				After	Before

The [Contractor] is responsible for determining equipment quantities and the desired delivery dates and providing them to the contracting officer within 45 days of Notice to Proceed. The [Contractor] is responsible for assembling and installing this equipment. Note that certain equipment not listed above, such as security containers, carrier cases and mail processing equipment, may be furnished and installed by USPS. Guidance may be requested from the contracting officer.

Note 1: Special order—the Postmaster must do an off-catalog eBay approval, then order on eMARS, if available, or by calling National Materials Customer Service at 1-800-332-0317, and NMCS will key in the order.

Note 2: The [Contractor] shall request this information from the Facilities Project Manager before completing and submitting this form.

Note 3: 2905 Box Modules are no longer available for purchase. The General Contractor shall relocate 2905 Box Modules from the existing facility to the new facility.

SECTION 011104

CONTRACT DOCUMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. The contract documents consist of the items included, or attached and incorporated by reference, in Section B, The Contract, B. 1500, *Attachments*.
- B. The contract documents consist of the items included, or attached and incorporated by reference, in the Lease, including General Conditions to USPS Lease and Construction Rider.

1.2 DRAWING LIST

- A. The contract drawings consist of the items included, or attached and incorporated by reference, in Section B, The Contract, B. 1500, *Attachments*.
- B. The contract documents are listed in the Construction Rider.

1 See *Index of drawings listed on the "Issued for Construction" Cover Sheet.*

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

## SECTION 012100

### ALLOWANCES

#### PART 1 – GENERAL

##### 1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for allowances associated with the project.

##### 1.2 RELATED SECTIONS

- A. Section 011000 – Summary of Work
- B. Section 012200 – Unit Prices

##### 1.3 DEFINITIONS

- A. Allowance: An amount, established in Article 1.5 of this Section, to be included in the base proposal price by the proposing contractor. The allowance shall be used as a mechanism to pay for costs associated with the work described in the allowance schedule, including those items identified in Section 012200.

##### 1.4 ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS

- A. The allowance amount shall be used for payment of costs associated with work included in the allowance schedule. Upon identification of such an item, inform the COR immediately.
- B. Request for authorization to proceed with work outside of project scope must be submitted to the COR for review and approval. Prepare a written summary of the work to be performed, following the procedures established by the COR. At a minimum, the written summary shall include the following:
  - 1. If proposed work includes unit price work identified in Section 012200, identify the unit price work to be performed, the measured amount to be included, the cost of the work per measured unit, and the total cost of work. If work to be performed is outside of the items identified in Section 012200, provide a written summary of the proposed work, including material, labor, overhead, profit, and other costs necessary to complete the work.
  - 2. Identify the amount of project allowance used to date, and the amount of allowance remaining for the project.
  - 3. Include additional information, if requested by the COR. Such additional information may include quotes or proposals submitted by subcontractors or material suppliers.
- C. Expenditures from the allowance are considered modifications to the original scope of work. The COR shall determine what changes in the work are paid for using the allowance. Do not begin work outside of project scope prior to receipt of authorization from the Contracting Officer.
- D. The COR reserves the right to reject Contractor's measurement of work-in-place that involves use of the allowance, and to have this work measured, at USPS expense, by an independent surveyor acceptable to the Contractor.

##### 1.5 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: No Allowances currently.

1.6 RETURN OF UNUSED ALLOWANCE

- A. Upon completion of project work, the Contract Price shall be adjusted by modification to provide the difference, if any, between the approved number of authorized expenditures and the original amount of the allowance. The Contractor is not entitled to any portion of the allowance not appropriated or used.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

## SECTION 012200

### UNIT PRICES

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Section includes: Administrative and procedural requirements for submission of unit prices to the U.S. Postal Service with Proposal.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other specification Sections.

##### 1.2 DEFINITIONS

- A. Unit price: A unit price is an amount proposed by offerors, stated within the Offer, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

##### 1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
- B. Extent of Unit Price Work:
  - 1. Determine the full extent of Work affected by proposed unit prices.
  - 2. Coordinate related work and modify surrounding work to integrate the Work of each unit price.
    - a. Include as part of each unit price, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the unit price.
- C. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- D. The COR reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at USPS expense, by an independent surveyor acceptable to Contractor.

##### 1.4 SUBMISSION REQUIREMENTS

- A. Submission Form: Complete Schedule of Unit Prices below and attach to the Proposal.
- B. Schedule: A "Schedule of Unit Prices" is included in the following Article. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each unit price.

##### 1.5 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: None

Add / Deduct: \_\_\_\_\_ dollars (each).

- B. Unit Price No. 2: None

Add / Deduct: \_\_\_\_\_ dollars (per square foot).

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

012200-2

USPS SPECIFICATION

UNIT PRICES

## SECTION 012300

### ALTERNATES

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Section includes: Alternates to be submitted to U.S. Postal Service with Proposal.
  - 1. Submission procedures.
  - 2. Documentation of changes to Contract Sum/Price and Contract Time.
- B. Related Documents: The Contract Documents, as defined in Section 011004 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

##### 1.2 DEFINITIONS

- A. Alternate: The net amount to be added to or deducted from the Base Proposal Price for work identified in Schedule of Alternates.

##### 1.3 SUBMISSION REQUIREMENTS

- A. Extent of Alternates:
  - 1. Determine the full extent of Work affected by proposed Alternates.
  - 2. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.
    - a. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.
- B. Submission Form: Complete Schedule of Alternates below and attach to Proposal.
  - 1. Substitutions are permitted unless prohibited by a relevant specification section for that product or material. Submit a request for substitution for any manufacturer not named in accordance with Section 016000 - Product Requirements.
- C. Schedule: The Alternates consist of the items included, or attached and incorporated by reference in Section B, The Contract, B. 1500 Attachments. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each Alternate.

##### 1.4 SELECTION AND AWARD OF ALTERNATES

- A. Acceptance or Rejection: Alternates quoted on Schedule of Alternates and attached to Proposal will be reviewed and accepted or rejected at the USPS's option. None, any, or all Alternates may be accepted or rejected by U.S. Postal Service.
- B. Accepted Alternates will be identified in the Contract.

##### 1.5 SCHEDULE OF ALTERNATES

- A. Not used.

#### PART 2 – PRODUCTS

NOT USED

012300-1



PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

012300-2

USPS SPECIFICATION

ALTERNATES

## SECTION 013200

### CONSTRUCTION PROGRESS DOCUMENTATION

#### PART 1 – GENERAL

##### 1.1 SCHEDULING WORK

- A. Before any of the work is started, the Contractor must confer with the COR and agree on a sequence of procedures mean of access to premises and building; delivery of materials and use of approaches; use of corridors, stairways, elevators, and similar means of communication; and the location of partitions, eating spaces for Contractor's employees, and the like.
- B. No work can be done during the holiday mailing season between [November 15 and January 5] without written permission from the COR.

##### 1.2 CONSTRUCTION PROGRESS CHART

- A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Construction Progress Chart*, prepare and submit a progress chart within five (5) days after receipt of the Notice to Proceed to show the principal categories of work corresponding with those used in the Schedule of Values:
  - 1. The order in which the Contractor proposes to carry on the work.
  - 2. The date on which it will start each category of work.
  - 3. The contemplated dates for completion.
- B. The chart must be in suitable scale to indicate graphically the total percentage of work scheduled to be in place at any time. At intervals as directed by the COR the Contractor must:
  - 1. Adjust the chart to reflect any changes in the contract work.
  - 2. Enter on the chart the total percentage of work in place.
  - 3. Submit six (6) copies of the chart to the Contracting Officer or their designated representative.

##### 1.3 CONTRACTOR-PREPARED NETWORK ANALYSIS SYSTEM

- A. Prepare a Network Analysis System in accordance with the terms and conditions of the contract provisions and clauses concerning *Network Analysis System and Update*, to include, at a minimum, the elements described below. In preparation of this system, the scheduling of construction is the responsibility of the Contractor. The requirement for the system is included to ensure adequate planning and execution of the work and to assist the COR in appraising the reasonableness of the proposed schedule and evaluating progress of the work. The system must consist of diagrams and accompanying mathematical analyses.
- B. Diagrams must show the order and interdependence of activities and the sequence in which the work is to be done as planned by the Contractor. The basic concept of a network analysis diagram must be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of the following activities. In all cases, the project completion date must be shown on the diagrams as the latest completion date of all activities.
- C. The detailed network activities must include, in addition to construction activities, the submittal and approval of samples of materials and shop drawings, the procurement of critical materials and equipment, and the fabrication of special materials and equipment and their installation and testing. All activities of the Postal Service that affect progress and dates required by the contract for completion of all or parts of the work must be shown. The activities that compose the following separate buildings and features must be separately identifiable by coding or use of sub-networks or both.

- D. The selection and number of activities are subject to the COR's approval. Detailed networks must be drafted to show a continuous flow from left to right, with no arrows from right to left. The following information must be shown on the diagram for each activity, preceding the following event numbers: description of the activity, cost, activity duration, and workforce requirements in workdays.
- E. A summary bar chart must be provided on a 30-inch x 42-inch sheet, consisting of a minimum of 30 activities and based on and supported by detailed diagrams. The summary bar chart must be time-scaled, using units of approximately one-half inch to equal 1 week, or other suitable scale approved by the COR. Weekends and holidays must be indicated.
- F. **Mathematical Analysis**
  - 1. The mathematical analysis of the network diagram must include a tabulation of each activity. The following information must be furnished as a minimum for each activity:
    - a. Numbers of preceding and following events.
    - b. Activity description.
    - c. Estimated duration of activities in days.
    - d. Earliest finish date.
    - e. Actual start date.
    - f. Actual finish date.
    - g. Latest start date.
    - h. Latest finish date.
    - i. Slack or float.
    - j. Monetary value of activity, with a labor and material cost breakdown.
    - k. Percentage of activity completed.
    - l. Contractor's earnings based on the portion of activity completed.
    - m. Workforce requirements in workdays.
  - 2. The program or means used in making the mathematical computation must be capable of compiling the total value of completed and partially completed activities and subtotals from separate buildings or features.
  - 3. The analysis must list the activities in sorts or groups as follows:
    - a. By the preceding event number, from lowest to highest, then in the order of the following event number.
    - b. By the amount of slack, then in order of preceding event number.
    - c. By responsibility in order of earliest allowance start date.
    - d. In order of latest allowable start dates, then in order of preceding event numbers, then in order of succeeding even numbers.
- G. **Submission and approval of the system must be as follows:**
  - 1. A preliminary network defining the Contractor's planned operations during the first 90 days after receipt of a Notice to Proceed must be submitted at the preconstruction conference after receipt of a Notice to Proceed.
  - 2. The complete network analysis, consisting of the detailed network mathematical analysis, schedule of anticipated earnings as of the last day of each month, and network diagrams, must be submitted within 30 days after receipt of Notice to Proceed.
- H. **Submission and approval of the system must be as follows:**
  - 1. A preliminary network defining the Contractor's planned operations must be submitted at the preconstruction conference after receipt of a Notice to Proceed.
  - 2. The complete network analysis must be submitted within 30 days after receipt of Notice to Proceed.
- I. The Contractor must submit at monthly intervals a report of actual construction progress by updating the mathematical analysis. Entering updated information into the mathematical analysis is subject to the approval of the COR.

- J. The report must show the activities or portion of activities completed during the reporting period and their total value as a basis for the Contractor's periodic request for payment. Payments made under the terms and conditions of the contract provisions and clauses, including those concerning *Payment (Construction)*, must be based on the total value of the activities or of partially completed activities after verification by the COR. The report must state the percentage of the work completed and scheduled on the report date and the progress along the critical path in terms of days ahead or behind the allowable dates. If the project is behind schedule, progress along other paths with negative slack must also be reported. The Contractor must also submit a narrative report with the updated analysis, which must include, but is not limited to, a description of the problem areas, current and anticipated delaying factors and their impact, and an explanation of corrective actions taken or proposed.
- K. The sheet size of diagrams must be 30 inches x 42 inches. Each updated copy must show the date of the latest revision.
- L. Initial submittal and complete revisions must be submitted in three copies.
- M. Periodic reports must be submitted in two copies.
- N. Network analysis system revisions occurring because of modifications or changes in the work must be in accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Network Analysis Systems and Update*.
- O. Float or slack is defined as the amount of time between the early start date and the late start date of any of the activities in the network analysis system schedule. Float or slack time is not time for the exclusive use or benefit of either the Postal Service or the Contractor. Extensions of time for performance required under the terms and conditions of the contract provisions and clauses, including those concerning *Changes; Differing Site Conditions; Termination for Convenience or Default; Excusable Delays; or Suspensions and Delays* may be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total float or slack along the channels involved at the time that Notice to Proceed was issued for the change.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 SCHEDULE OF SUBMITTALS

- A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning Shop Drawings, Coordination Drawings, *Record “As Built” Drawings, and Schedules*; within 30 days after receiving a Notice to Proceed, the Contractor must complete the Schedule of Submittals, in the format indicated below, in duplicate, listing all items that must be furnished for review and approval by the Postal Service. The schedule must indicate the type of items (such as sample, shop drawings, catalog cut, and so forth) and include the scheduled dates of submittal. In preparing the schedule, adequate time (10 business days or more, exclusive of time in the mails) must be allowed for review and approval and possible resubmittal. Also, the schedule must be coordinated with the approved construction progress chart. The Contractor must revise and/or update the schedule as directed. Such revised schedules must be made available to the COR for monitoring.
- B. Within 30 days after receiving a Notice to Proceed, the Contractor must complete and submit to the COR a listing of all subcontractors, including subcontractor name, address, telephone number, fax number and email address. Include an updated list with each progress payment request.
- C. Schedule of Submittals Format

Project \_\_\_\_\_

Contract No. \_\_\_\_\_

Project Description \_\_\_\_\_

Spec. Section	Spec. Description	Paragraph Number	*Submittal Type	Date		Action Taken	Assigned Number
				Submittal	Returned		

\*Submittal Type:

- C – Certificate
- S – Sample
- SD – Shop Drawing

- CD – Catalog Data
- PL – Spare Parts List
- MM – Maintenance Manual

1.2 SHOP DRAWINGS AND RELATED DATA

- A. Submittal of shop drawings, samples and related data must conform to the requirements of the terms and conditions of the contract provisions and clauses, including those concerning, *Record “As Build” Drawings, and Samples*. Prior to submittal, the Contractor must stamp the submittal to indicate that it has been reviewed and approved. The Contractor must make any corrections required by the COR. If the Contractor considers any correction indicated on the drawings to constitute a change to the contract drawings or specifications, notice, as required under the terms and conditions of the contract provisions and clauses, including those concerning Changes must be given to the COR. [Four] [ ] prints of all

approved shop drawings must be given to the COR. The approval of the drawings by the COR must not be construed as a complete check but indicates only that the general method of construction and detailing is satisfactory. Approval of the shop drawings does not relieve the Contractor of responsibility for any error that may exist because the Contractor is responsible for the dimensions and design of adequate connections and details and for satisfactory construction of all work. The submission by the Contractor must be accompanied by a transmittal letter of a type approved by the COR.

1. Each shop drawing must have a blank area of 5 by 5 inches, located adjacent to the title block. The title block must display:
  - a. Number and title of drawing;
  - b. Date of drawing or revision;
  - c. Name of project building or facility;
  - d. Name of Contractor and (if appropriate) of subcontractor submitting drawing;
  - e. Clear identity of contents and location on the work; and
  - f. Project title and contract number.
2. All drawings to be provided shall be clear and fully representative of the facility and fixed mechanization work.
3. Drawing files to be in .dwg and .pdf formats. .dwg files to be generated from AutoCAD revision 12 or other revision level concurred by USPS.
4. Documents other than drawings shall be provided in Microsoft Word format.
5. Interim project documentation may be provided to USPS electronically
6. All final project documentation shall be provided to the USPS on a single CD or DVD media

### 1.3 EQUIPMENT ROOM LAYOUT DRAWINGS

- A. The Contractor must prepare and submit equipment room layout drawings as required by the technical provisions as well as for areas where equipment proposed for use could present interface or space difficulties. Room layout drawings must be submitted within 40 days after receiving a Notice to Proceed and must conform to the specified requirements for shop drawings. Submittals describing the various mechanical and electrical equipment items that are to be installed in the areas represented by the layout drawings must be assembled and submitted concurrently and must be accompanied by the room layout drawings. Room layout drawings must be consolidated for all trades, to scale, and must show all pertinent structural and fenestration features and other items, such as cabinets, that are required for installation and that affect the available space. All mechanical and electrical equipment and accessories must be shown to scale in the plan and also in elevation or section in their installation positions. Ductwork and piping must be shown.

### 1.4 MATERIAL, EQUIPMENT, AND FIXTURE LISTS

- A. When required by the technical provisions, lists of materials, equipment, and fixtures must be submitted by the Contractor in accordance with the requirements specified for shop drawings. The lists must be supported by sufficient descriptive material, such as catalogs, cuts, diagrams, and other data published by the manufacturer, as well as by evidence of compliance with safety and performance standards, to demonstrate conformance to the specification requirements. Catalog numbers alone are not acceptable. The data must include the name and address of the nearest service and maintenance organization that regularly stocks repair parts. No consideration will be given to partial lists submitted from time to time. Approval of materials and equipment is tentative, subject to submission of complete shop drawings indicating compliance with the contract documents.

### 1.5 CERTIFICATES OF COMPLIANCE

- A. Any certificates required for demonstrating proof of compliance of materials with specification requirements, including mail certificates, statements of application, and extended guarantees, must be signed and submitted 4 copies to the COR at least 10 days before delivery. The Contractor must review all certificates before submissions are made to the COR, to ensure compliance with the contract

specification requirements and to ensure that the affidavit is properly signed. Each certificate must be signed by an official authorized to certify on behalf of the manufacturing company and must contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates must contain the name and address of the testing laboratory and the dates of tests to which the report applies. Certification must not be construed as relieving the Contractor from furnishing satisfactory material if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

#### 1.6 A-E'S REVIEW OF SUBMITTALS

- A. When submittals are reviewed by the A-E on behalf of the COR, each submittal must be returned to the Contractor stamped or marked by the A-E in one of the following ways:
  - 1. A Action: The Contractor is advised that "A Action" means that fabrication, manufacture, or construction may proceed, provided the work complies with the contract documents.
  - 2. B Action: The Contractor is advised that "B Action" means that fabrication, manufacture, or construction may proceed, provided the work complies with the A-E's notations and the contract documents.
  - 3. C Action: The Contractor is advised that "C Action" means that no work may be fabricated, manufactured, or constructed and that the Contractor must make a new submittal to the A-E. Any submission marked "C Action" is not permitted on the site.
- B. The A-E must return reproducible stamped "A Action" or "B Action" to the Contractor, who is responsible for obtaining prints of them and for distributing them to the field and to subcontractors.
- C. In the case of shop drawings in the form of manufacturers' descriptive literature, catalog cuts, and brochures stamped "A Action" or "B Action," the A-E must return the stamped copies to the Contractor, who is responsible for distributing them to the field and to the subcontractors. If the shop drawings are stamped "C Action," the A-E will return stamped copies to the Contractor, who must submit new shop drawings to the A-E.
- D. In the case of samples stamped "A Action" or "B Action," the A-E must return one of the samples to the Contractor. In the case of samples stamped "C Action," the A-E must return all the submitted samples.

#### 1.7 SPARE PARTS DATA

- A. Spare parts data must be submitted in quadruplicate in accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Spare Parts Data*.

#### 1.8 SCHEDULE OF VALUES

- A. In accordance with the terms and conditions of the contract provisions and clauses concerning, *Construction Cost Breakdown*, the Contractor must submit a construction cost breakdown using the attached Schedule of Values.
- B. Submit the construction cost breakdown after contract award to the COR. A Sample Schedule of Values and Definitions is attached to this Section, as Attachment A.
- C. Do not delete items from the Schedule of Values form. The number of items provided on the Schedule of Values form are the minimum required; additional subdivision of these items may be provided by the Contractor.
- D. If the contract price changes, the Schedule of Values must be revised to reflect the change(s) and forwarded to the COR.

E. A current Schedule of Values must accompany all Contractor Requests for Payment.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED



### Fixed Mechanization Construction Cost Estimate Breakdown Summary

Project \_\_\_\_\_ Location \_\_\_\_\_  
 General \_\_\_\_\_  
 Contractor \_\_\_\_\_  
 Mechanization \_\_\_\_\_  
 Contractor \_\_\_\_\_  
 Date \_\_\_\_\_ Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_

1.	Bulk Conveyors				
	Designation	Cost	Designation	Cost	
	_____	_____	_____	_____	
	_____	_____	_____	_____	
	_____	_____	_____	_____	
	<i>Subtotal</i>				
			Quantity	Length (ft.)	
3.	Extendable Conveyors (loading)		_____	_____	
4.	Extendable Conveyors (unloading)		_____	_____	
5.	Sack Sorting Machine (belt)		_____	_____	
6.	Sack Sorting Machine (over and under)		_____	_____	
7.	Sack Sorting Machine (carousel)		_____	_____	
8.	Multi-Slide Sorter (sacks)		_____	_____	
9.	Multi-Slide Sorter (parcels)		_____	_____	
11.	Sawtooth Platforms				
	Designation	Cost	Designation	Cost	
	_____	_____	_____	_____	
	_____	_____	_____	_____	
	_____	_____	_____	_____	
	Other				_____
	<i>Subtotal</i>				_____
					_____
					_____
					_____
					_____
		Cost	Quantity (Total)	Length	
10.	Tray Conveyors				
	MPR (24VDC)	_____	_____	_____	
	Spirals All, (Up/DWN)	_____	_____	_____	
	Belt	_____	_____	_____	
	Diverging and Converging	_____	_____	_____	
	Gravity	_____	_____	_____	
	LCTS	_____	_____	_____	
	HSTS	_____	_____	_____	
	Other	_____	_____	_____	
	<i>Subtotal</i>				_____
12.	Other	_____	_____	_____	
	<i>Subtotal</i>				_____
	<i>Total Fixed Mechanization Cost</i>				_____

END OF SECTION



## SECTION 013543

### ENVIRONMENTAL PROCEDURES

#### PART 1 – GENERAL

##### 1.1 SCOPE

- A. This section is required in accordance with the terms and conditions of the contract provisions and clauses, including those concerning Safety & Health Standards, Accident Prevention, Protection of the Environment, Existing Vegetation, Structures, Utilities and Improvements, and Handling Asbestos and other Hazardous Materials. The work covered by this section consists of furnishing all labor, material, and equipment and performing all work required for compliance with environmental regulations and preventing pollution during, and because of, construction operations under this contract, in addition to those measures set forth in other technical provisions of these specifications.
- B. The Contractor and subcontractors must comply with all applicable federal, state, and local laws and regulations related to the environment, health, and safety.

##### 1.2 NOTIFICATION

- A. The Contractor must, after receiving a notice of noncompliance with the foregoing provisions, immediately take corrective action. The notice, when delivered to its Contractor or its authorized representative at the site of the work, is deemed sufficient for this purpose. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost because of any such stop orders may be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is subsequently determined that the Contractor was in compliance and the Contractor demonstrates that it is otherwise entitled to an extension of time, excess costs or damages, under the applicable terms and conditions of the contract provisions and clauses.

##### 1.3 ENVIRONMENTAL REGULATORY COMPLIANCE

- A. Within 30 days after receiving the notice to proceed or not less than 15 days prior to commencing on-site work, the Contractor must submit any environmental documents that are required by federal, state, or local environmental regulations. Plans must be approved by the COR prior to commencing on-site work and must describe and include, but is not limited to, the following.
  - 1. Erosion Control and Stormwater Management Plan that describes erosion control methods, surface drainage, storm water permitting requirements, and if applicable, protection of site wetlands and/or compliance with wetland permits. This must ensure any federal, state, or local permitting requirements for site preparation, erosion control or surface drainage are met.
  - 2. Landscape Management and Protection Plan that ensures any site-specific beneficial landscaping requirements are met. The plan shall describe the prevention and restoration of landscape damage, temporary roads and embankments, and post construction cleanup as prescribed in the terms and conditions of the contract provisions and clauses, including those concerning *Protection of the Environment, Existing Vegetation, Structures, Utilities, and Improvements*.
  - 3. Waste Minimization and Management Plan must describe how natural resources potentially impacted by construction will be protected or managed; construction wastes will be stored and disposed of or recycled; and pollutants associated with building materials will be controlled. The waste minimization and management section of the plan must also list materials and construction debris to be recycled and address the disposal of solid and hazardous wastes and materials, including asbestos and lead-based paint. It

- must also include tables applicable to the reclamation of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) in accordance with 1.4 (B) below.
4. Environmental Compliance Plan must document NEPA compliance by describing mitigation measures to address environmental concerns/sensitive receptors identified in the National Environmental Policy Act (NEPA) document(s) in Section B. 1500, *Attachments*, of the contract.
  5. The construction specifications in this contract must include mitigation measures to avoid or minimize potential environmental impacts identified in the NEPA document(s).

#### 1.4 ENVIRONMENTAL SITE CONTROLS

- A. Location of Hazardous Materials: The location of the Contractor's temporary storage of any hazardous materials and/or wastes must be appropriately marked and included in the health and Safety Plan (see Section 1.5 below).
- B. Refrigerant Recovery, Recycling, and Disposal: Any work involving the replacement or repair of equipment containing refrigerant shall meet the following requirements:
  1. Recover and recycle or dispose of refrigerant from equipment according to 40 CFR 82 and local regulations.
  2. The work shall be completed by a certified refrigerant recovery technician, per 40 CFR 82 and local regulations.
  3. Provide a statement signed by the certified refrigerant recovery technician that the work was completed per 40 CFR 82 and local regulations. Include the name and address of technician and date refrigerant was recovered.
- C. Post-construction Cleanup or Obliteration: The Contractor must remove and properly dispose of all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, excess or waste materials, or any other vestiges of construction as directed by the COR. No separate or direct payment may be made for post-construction cleanup and all associated costs must be considered included in the contract price.
- D. Historical and Archeological: Monuments, markers, and works of art must be protected. Items discovered that have potential historical or archeological interest must be preserved. The Contractor must leave the archeological find undisturbed and must immediately report the find to the COR so that the proper authority may be notified.
- E. Dust Control: The Contractor must keep the site free from dust in accordance with applicable federal, state and/or local regulations.
- F. Noise Minimization: The Contractor must perform demolition and construction operations to minimize noise including conducting work during less sensitive hours of the day in accordance with applicable noise control regulations.

#### 1.5 HEALTH AND SAFETY

- A. Prior to commencing on-site work, the Contractor must submit an Occupational Safety and Health Administration (OSHA) Emergency Action Plan (EAP) to the Contracting Officer to demonstrate compliance by the Contractor and subcontractors with applicable OSHA regulations. If the Contractor is not required by OSHA to develop a written EAP, i.e., if 10 or fewer are employed for the construction project or any other specific regulations identified by OSHA, then the Contractor shall submit to the Contracting Officer a signed letter stating the Contractor shall meet OSHA's EAP requirements in a verbal communication to all employees.
- B. The Postal Service has provided a *Safety and Health Guide for Contractors*, as Attachment A to this section. Prior to commencing on-site work, Contractor must read the *Safety and Health Guide for Contractors* and must sign the attached Certificate of Understanding acknowledging and accepting the requirements stated therein.

- C. Prior to commencing on-site work, the Contractor must submit a project-specific Project Safety Plan to the Contracting Officer. The plan must include, but is not limited to, hazard communication, labeling, emergency response and preparedness and training.
- D. Copies of Material Safety Data Sheets (MSDSs) for any hazardous material(s), as defined by OSHA's Hazard Communications Standard, must be included whenever such materials arrive on-site. MSDSs must be kept together and maintained centrally on-site through to project completion. Provide a copy of each MSDS in the Operating and Maintenance Manual. The use of asbestos containing materials, more than one percent as defined by US Environmental Protection Agency regulations, is prohibited in the construction of this project. Provide an executed copy of the "Certificate of Asbestos and Lead-Based Paint (New Work)" in the Operating and Maintenance Manual and include a copy with the final payment request.
- E. The use of lead-based paint is prohibited in the construction of this project.
- F. The use of lead-containing solder for plumbing and plumbing fixtures is prohibited in the construction of this project.
- G. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Asbestos Free and Lead-Based Paint Free Certification*, the Contractor must sign and submit to the Contracting Officer the attached "Certification of Asbestos and Lead-Based Paint" for this project. The signed certificate is required to be included in the final payment request.
- H. Do not use any of the USPS targeted chemicals (see regulated and prohibited materials identified under Safety and Health and related environmental requirements).

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

USPS Specification

# Safety and Health Guide for Contractors

## Certificate of Understanding

This *Safety and Health Guide for Contractors* was developed by the Postal Service to provide guidance for contractors hired to perform repair, alteration, renovation, demolition, equipment installation, and other work requiring access to postal-owned or -leased property.

### Distribution

A copy of this Certificate of Understanding should be signed by the Contractor's representative at the post award orientation conference or before the commencement of work. A copy of this guide should be readily accessible where the work is being performed. The contracting officer's representative (COR) should thoroughly brief the Contractor's representative on the Contract Safety and Health Requirements contained herein.

### Contractor's Verification Statement

As a representative of \_\_\_\_\_ (Contractor's name), I have received the *Safety and Health Guide for Contractors* prepared by the Postal Service. As the Contractor's representative, I understand and accept the requirements contained herein, and I have reviewed each of the required sections of the guide with the COR and/or the designated Postal Service representative. I agree to review the contents of this guide with all subcontractors hired to perform work on postal property.

### Contractor's Representative

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Designated Postal Service Representative

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Safety Representative (If Required by COR)

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Postal Service CO, COR, or Project Manager

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Maintain a copy of this signed form in the Postal Service and Contractor's project files.**

## Safety and Health and Related Environmental Requirements

The Contractor is required to meet all applicable OSHA, federal, state, and local safety, health, and related environmental requirements in addition to the US Postal Service requirement listed in this table.	
Issue	Postal Requirements
<b>Asbestos</b>	<p><i>Review of Facility Asbestos Survey:</i> Before any building maintenance, equipment installation, renovation, alteration, demolition, or other project begins, determine whether ACBM will be disturbed.</p> <p><i>Proper Work Practices:</i> If ACBM is present, follow proper control procedures and work practices.</p> <p><i>Consultation With Facility Asbestos Coordinator:</i> Consult with the facility manager or his or her designee before the start of any work likely to disturb ACBM. Disturbance means activities that crumble or pulverize ACBM or presumed asbestos-containing material (PACM) or generate visible debris. Operations may include drilling, abrading, cutting a hole, pulling cable, and crawling through tunnels or attics and spaces above the ceiling where asbestos is actively disturbed or asbestos-containing debris is actively disturbed.</p> <p><i>Asbestos Work Authorization:</i> You must have an approved Form 8210, <i>Work Authorization - Asbestos</i>, before work begins within any building containing asbestos.</p>
<b>Barricades, Barriers, and Warnings</b>	Your barricades must meet the OSHA requirements. In addition, you assume control of your work area during your activities unless otherwise specified in writing by the contracting officer (CO) or contracting officer's representative (COR).
<b>Confined Spaces</b>	<p>Confined space work must meet the OSHA requirements. You must have a comprehensive confined space program that includes a written program, employee training, entry and testing equipment, and rescue capabilities.</p> <p>If you require access to confined space requiring a permit, then the trained, designated Postal Service representative must review and approve the project and permit. Entry into other confined spaces must be in accordance with OSHA regulations.</p>
<b>Electrical Work</b>	Lock or rope off work areas involving exposed energized equipment or have an attendant present to prevent accidental contact by unqualified people. Refer to the Barricade section of this guideline for additional information.
<b>Elevated Work and Fall Protection</b>	Follow strictly the applicable OSHA fall protection requirements.
<b>Excavation</b>	<p>All excavations 4 feet or more in depth must be properly shored or sloped and meet all OSHA requirements.</p> <p>Before any digging or drilling commences, inform the Postal Service COR and call Dig Safe or its local equivalent to determine whether any underground utilities are located in the work area. Submit documentation that these notifications have been performed. You must not begin digging or drilling until you have verified that underground utilities have been identified and are properly marked so that work may be accomplished in a safe manner.</p>
<b>Fire Protection</b>	<p>Do not block, remove, or otherwise prevent Postal Service fire extinguishers from being immediately accessible and usable.</p> <p>If a system must be impaired by a scheduled shutdown, notify the appropriate Postal Service representative and do not proceed without Postal Service authorization.</p>
<b>Hazard Communication</b>	<p>Inform the Postal Service before any chemicals are used. Before materials are brought on site, provide material safety data sheets (MSDSs) and an inventory of materials. For projects that are anticipated to use substantial quantities of hazardous materials, you may be required to provide a routing, storage, and waste disposal plan.</p> <p>Upon request, the Postal Service will make available to you MSDSs for hazardous materials the Postal Service uses in the Contractor work area.</p>
<b>Hazardous Materials</b>	<p>Follow all OSHA requirements regarding hazardous materials. Hazardous materials include, but are not limited to, flammable and combustible liquids, gasoline, diesel fuel, motor oil, lubricating oil, hydraulic oil, corrosive cleaners, and battery acid.</p> <p>Provide secondary containment for all containers of liquids that are over 5 gallons in capacity.</p> <p>Immediately report all hazardous material releases ("spills"), regardless of how small or where they occur, to the designated Postal Service representative. Releases include solids, liquids, and gases.</p>
<b>Hot Work</b>	<p>Do not begin any hot work until a Postal Service qualified person has completed and signed a Postal Service Hot Work Permit. The permit will be valid for only a single work shift. You must display the permit at the work site.</p> <p>You are prohibited from performing hot work (a) when the Postal Service has not authorized</p>

	<p>it, (b) in locations in which fire protection systems have been impaired, (c) in the presence of explosive or flammable atmospheres, or (d) in locations where large quantities of flammable and combustible materials are unprotected.</p>
<b>Powered Industrial Trucks</b>	<p>Powered industrial trucks and other mobile equipment must follow all traffic rules of the postal facility. The maximum speed limit for in-plant powered vehicles is 5 miles per hour. Many work areas have posted speed limits that you must strictly follow. Perform refueling only in authorized locations following safe procedures.</p> <p>As a general rule, the Postal Service does not allow gas- or diesel-powered industrial equipment inside postal facilities. Coordinate exceptions to the rule through the servicing safety office.</p>
<b>Ladders</b>	<p>Strictly follow all OSHA requirements regarding ladders. Barricade the ladder use area to prevent contact with mobile equipment and employees.</p>
<b>Lead-Based Paint</b>	<p><i>Review of Facility Lead Survey:</i> Before any construction, alterations, and/or repair activities begin, determine whether LBP will be disturbed. If the painted surface has not been tested, you must have it tested before beginning any activities that could potentially disturb LBP.</p> <p><i>Proper Work Practices:</i> If LBP is present, follow proper control procedures and work practices.</p> <p><i>Consultation With Facility Manager:</i> Consult with the facility manager or his or her designee before the start of any work likely to disturb LBP. Examples of activities that may affect LBP include paint removal by scraping, sanding, power tools, or heat guns; alterations that include removing drywall, structural steel, or other building materials coated with LBP; welding, cutting, or other hot work on coated metal surfaces; abrasive blasting of mail boxes and other equipment; and moving or cleaning of abrasive blasting enclosures.</p>
<b>Lockout/Tagout</b>	<p>Provide a copy of your lockout/tagout procedures, which must meet or exceed the OSHA Lockout/Tagout standard. You will be given access to and must review the Postal Service lockout/tagout program.</p> <p>If you encounter a Postal Service lockout/tagout device that prevents the continuation of work, do not make any attempts to remove, tamper with, or bypass the devices. Contact a Postal Service Maintenance official and make arrangements to have the lockout device removed in accordance with Postal Service lockout removal policies.</p>
<b>Machinery and Equipment</b>	<p>Postal facilities use state-of-the-art mail handling machinery, some of which may operate automatically. Hazards may include, but are not limited to, moving parts and power transmission apparatus, pinch points, electrical contact, and hot surfaces.</p> <p>Do not use machine surfaces as work platforms.</p> <p>Contact the designated Postal Service representative concerning facility machinery.</p>
<b>Personal Protective Equipment</b>	<p>Before beginning work, evaluate the work area for hazards, determine whether contract employees will be required to use personal protective equipment (PPE) to protect themselves from these hazards, and document the hazard assessment.</p> <p>Wear the PPE required by the postal facility in which you are working, regardless of your perception of hazard potential.</p>
<b>Regulated And Prohibited Materials</b>	<p><i>Pesticides.</i> The Postal Service has restricted the use of pesticides. Obtain prior approval of the district environmental compliance coordinator for special cases that may require the use of pesticide treatments.</p> <p><i>Chemical Prohibition.</i> Adhere to the Postal Service Hazard Communication Program and chemical prohibition policies. Do not use on postal property any of the chemicals prohibited by EPA unless a Postal Service person authorizes its use (each of these chemicals must be authorized separately). The USPS Office of Sustainability can supply the list.</p> <p><i>Asbestos-Free Products.</i> Install no asbestos-containing products or materials in postal facilities.</p> <p><i>Lead.</i> Apply no lead-based paint in postal facilities.</p>
<b>Scaffolding</b>	<p>Follow strictly the applicable OSHA scaffolding requirements.</p> <p>Provide adequate barrier protection around the scaffolding to prevent hazards to postal workers.</p>
<b>Walking and Working Surfaces</b>	<p>If the project requires temporary modifications to the means of egress, inform the designated Postal Service representative before performing such actions, provide appropriate alternative means of egress, and communicated these to all employees.</p>



## Emergency Procedures

<b>Preparations for Emergency</b>	<p>Be prepared for emergency situations.            Ensure that emergency telephone numbers are site specific, readily available, easily read, and communicated to all employees.            Train and authorize employees to implement emergency procedures.</p>
<b>Medical Emergencies</b>	<p>Have procedures and medical supplies to provide emergency medical services for your own personnel.            Determine how to contact emergency medical services before work begins, and have on-site capabilities to contact such services immediately.</p>
<b>Fires</b>	<p>See Fire Protection above.            In the event of a fire, you must:</p> <ul style="list-style-type: none"> <li>- Immediately remove personnel from the area or building following Postal Service evacuation procedures.</li> <li>- Immediately contact the nearest postal employee and inform him or her of the fire. You may also activate an emergency alarm in the area. If no postal employees are on-site, immediately contact the local fire department.</li> </ul> <p>Personnel trained in the use and limitations of fire extinguishers may attempt to extinguish the fire if it is safe to do so.</p>
<b>Chemical Releases</b>	<p>See Hazardous Materials above.            If the event of a hazardous material release, you must:</p> <ul style="list-style-type: none"> <li>- Immediately remove personnel from the area or building following Postal Service evacuation procedures.</li> <li>- Immediately contact the designated Postal Service representative and inform him or her of the release. You may also activate an emergency alarm in the area. If no postal employees are on-site, immediately contact the local fire department.</li> </ul> <p>Contractor personnel should not respond to the release unless specifically trained and protected to perform hazardous material response.</p>
<b>Power Outages</b>	<p>In the event of a power outage, you must:</p> <ul style="list-style-type: none"> <li>- Immediately stop work and assemble for a head count and possible facility egress.</li> <li>- Inform all contract employees that equipment may automatically restart when power resumes.</li> <li>- Immediately contact the designated Postal Service representative and inform him or her of the status of contract work and personnel head count. Relay at this time all hazards created due to the power outage.</li> </ul> <p>When power resumes evaluate the status of operations that were being performed relative to hazard potential. For example, the interruption of ventilation in confined spaces may generate atmospheric hazards.</p>
<b>Accident Investigation and Reporting</b>	<p>As soon as is practical after an accident, investigate and document an accident investigation. The documentation must describe the incident and identify the causes and the corrective actions that will prevent future incidents.            Report all accidents, whether or not they result in injury. Give the written report to the Postal Service COR within 24 hours of the accident or incident.</p>

## SECTION 014000

### QUALITY REQUIREMENTS

#### PART 1 – GENERAL

##### 1.1 CONTRACTOR QUALITY CONTROL

- A. Contractor Quality Control: The Contractor is responsible for the overall quality of all its own work and the work performed by their subcontractors working under this contract. The quality of any part of the work installed must not be less than that required by the technical divisions of this specification. If the COR determines that the quality of work does not conform to the applicable specifications and drawings, the Contractor will be advised in writing of the areas of nonconformance, and within 7 days the Contractor must correct the deficiencies and advise the COR in writing of the corrective action taken.
- B. Noncompliance with Quality Control Requirements: Failure of the Contractor to comply with the above requirements may be cause for termination for default as defined in the terms and conditions of the contract provisions and clauses, including those concerning, *Termination for Convenience or Default*, of the general contract clauses.

##### 1.2 SUBMITTALS

- A. Prior to the start of on-site work, the Contractor must submit to the Contracting Officer a Contractor Quality Control Plan that includes the following information:
  - 1. Quality Control Organization: In chart form, showing relationship of Quality Control organization to other elements of Contractor's organization.
  - 2. Names and qualifications of personnel in Quality Control organization, including Contractor Quality Control Representative, inspectors, Independent Testing and Inspection Laboratory, and Independent HVAC Test and Balance Agency.
  - 3. Procedures for reviewing coordination drawings, shop drawings, certificates, certifications, or other submittals.
  - 4. Testing and inspection schedule, keyed to Construction Schedule, indicating tests and inspections to be performed, names of persons responsible for inspection and testing for each segment of work including preparatory, initial, and follow-up.
  - 5. Proposed forms to be used including Contractor's Daily Report, Contractor Test and Inspection Report and Non-Compliance Check-Off List.
- B. For independent testing and inspection laboratories, submit the following:
  - 1. Name.
  - 2. Address.
  - 3. Telephone number.
  - 4. Names of full-time registered engineer.
  - 5. Responsible officer.
  - 6. Copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by inspection.

##### 1.3 QUALITY CONTROL PROCEDURES

- A. Monitor quality control over Contractor staff, subcontractors, suppliers, manufacturers, products, services, site conditions, and workmanship.

- B. Comply fully with manufacturer's published instructions, including each step-in sequence of installation.
- C. Should manufacturer's published instructions conflict with Contract Documents, request clarification from COR before proceeding.
- D. Comply with specified standards as a minimum quality for work, except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons who are thoroughly qualified and trained in their respective trade, to produce workmanship of specified quality.
- F. Perform tests required by governing authorities having jurisdiction and utilities having jurisdiction.

#### 1.4 TESTING AND INSPECTION LABORATORY SERVICES

- A. Selection and Payment:
  1. The Contractor shall pay for services of an Independent Testing and Inspection Laboratory to perform specified testing and inspection.
  2. Employment of Independent Testing and Inspection Laboratory in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.
- B. Quality Assurance:
  1. Comply with requirements of all applicable ASTM standards.
  2. Laboratory: Authorized to operate in State in which Project is located.
  3. Laboratory Staff: Maintain a full-time registered engineer on staff to review services.
  4. Testing Equipment: Calibrated at reasonable intervals with devices of and accuracy traceable to either National Bureau of Standards or accepted values of natural physical constraints.
- C. Laboratory Responsibilities. Contractor shall ensure the Laboratory has the following responsibilities and limits on authority:
  1. Test samples of mixes submitted by Contractor.
  2. Provide qualified personnel at Project site. Cooperate with COR and Contractor in performance of services.
  3. Perform specified sampling, testing, and inspection of Products in accordance with specified standards.
  4. Determine compliance of materials and mixes with requirements of Contract Documents.
  5. Promptly notify Contractor Quality Control Representative and COR of observed irregularities or non-conformance of work or Products.
  6. Submit one copy of all test results directly to the COR.
  7. Perform additional tests as required by COR.
  8. Attend appropriate preconstruction meetings and progress meetings.
- D. Limits on Authority. Contractor shall ensure the Laboratory has the following limits on authority:
  1. Laboratory may not release, revoke, alter, or expand on requirements of Contract Documents.
  2. Laboratory may not approve or accept any portion of work.
  3. Laboratory may not assume any duties of Contractors.
  4. Laboratory has no authority to stop work.

#### 1.5 CONTRACTOR FIELD INSPECTION AND TESTING

- A. Contractor: Test and Inspect work provided under this Contract to ensure work follows Contract requirements. Required tests and inspections are indicated in each individual Specification Section.

- B. Preparatory Inspection: Performed prior to beginning work and prior to beginning each segment of work and includes:
  - 1. Review of Contract requirements.
  - 2. Review of shop drawings and other submittal data after return and approval.
  - 3. Examination to assure materials and equipment conform to Contract requirements.
  - 4. Examination to assure required preliminary or preparatory work is complete.
- C. Initial Inspection: Performed when representative portion of each segment of work is completed and includes:
  - 1. Performance of required tests.
  - 2. Quality of workmanship.
  - 3. Review for omissions or dimensional errors.
  - 4. Examination of products used, connections and supports.
  - 5. Approval or rejection of inspected segment of work.
- D. Follow-Up Inspections: Performed daily, and more frequently as necessary, to assure non-complying work has been corrected.
- E. Testing and Inspection: Perform testing and inspection in accordance with requirements in individual Specification Sections.

#### 1.6 CONTRACTOR'S DAILY REPORT

- A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Performance and Superintendence of Work by Contractor*, the Contractor shall submit daily report to COR, for days that work was performed. Include the following information:
  - 1. Date, weather, minimum and maximum temperatures, rainfall, and other pertinent weather occurrences.
  - 2. Daily workforce of Contractor and subcontractors, by trades.
  - 3. Description of work started, ongoing work, and work completed by each subcontractor.
  - 4. Coordination implemented between various trades.
  - 5. Approval of substrates received from various trades.
  - 6. Nonconforming and unsatisfactory items to be corrected.
  - 7. Remarks, to include at a minimum, any potential delays, schedule changes, workplace incidents or other items of note. However, nothing reported herein shall relieve the Contractor of the separate responsibility under other terms and conditions of the Contract provisions and clauses to provide specific notice to the Contracting Officer,

#### 1.7 CONTRACTOR'S TEST AND INSPECTION REPORTS

- A. Prepare and submit, to COR, a written report of each test or inspection signed by Contractor Quality Control Representative performing inspection within 2 days following day inspection was made.
- B. Include the following on written reports of inspection:
  - 1. Cover sheet prominently identifying that inspection "CONFORMS" or "DOES NOT CONFORM" to Contract Documents.
  - 2. Date of inspection and date of report.
  - 3. Project name, location, solicitation number, and Contractor.
  - 4. Names and titles of individuals making inspection, if not Contractor's Project Field Superintendent.
  - 5. Description of Contract requirements for inspection by referencing Specification Section.
  - 6. Description of inspection made, interpretation of inspection results, and notification of significant conditions at time of inspection.
  - 7. Requirements for follow-up inspections.

1.8 NON-COMPLIANCE CHECK-OFF LIST

- A. Maintain check-off list of work that does not comply with Contract Documents, stating specifically what is non-complying, date faulty work was originally discovered, and date work was corrected. No requirement to report deficiencies corrected same day it was discovered. Submit copy of Non-Compliance Check-Off List of non-complying work items to COR on a weekly basis.

1.9 COMPLETION AND INSPECTION OF WORK

- A. Prior to final acceptance by Contracting Officer, submit a certification signed by Contractor to Contract Officer stating that all work has been inspected and all work, except as specifically noted, is complete and in compliance with Contract Documents.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

## SECTION 015000

### TEMPORARY FACILITIES AND CONTROLS

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Provide all temporary facilities and services required to complete the Work and to comply with OSHA and other applicable regulations.
- B. Maintain temporary facilities in a proper, safe, operating, and sanitary condition for the duration of this Contract. Upon completion of this Contract, all such temporary work and facilities shall be removed in their entirety and the premises will be restored to its prior condition.

##### 1.2 RELATED SECTIONS

- A. Section 015600 - Temporary Barriers and Enclosures

##### 1.3 PROJECT SIGNAGE

- A. Provide and maintain a construction project sign at the location directed by the COR. The sign to conform to the Construction Sign as detailed in the Contract drawings. The information to complete the wording on the sign is provided by the COR. Erect the sign within 15 days after receiving a Notice to Proceed. The sign to be removed upon completion of the Work and destroyed, and the premises restored to its prior condition.
- B. Construction Site Sign:
  - 1. Silk-screened, painted or pressure-sensitive vinyl letters applied to Medium Density Overlay plywood sign.
  - 2. Red: Match Benjamin Moore OP-67.
  - 3. Blue: Match PPG 7062 Federal Blue.
  - 4. White background.
- C. Construct and erect a minimum of two hard hat signs at locations designated by the COR. Signs to be erected prior to the commencement of on-site work.
- D. Other signage: No unapproved signs, brand logos, or graphics shall be affixed to temporary walls, partitions, doors, barricades, and fences.

##### 1.4 PROJECT BULLETIN BOARD

- A. Provide a weatherproof bulletin board, not less than 36 inches wide and 30 inches high, with hinged glass door adjacent to, or mounted on, the Contractor's project office. If adjacent to the office, the bulletin board to be securely mounted on not less than two posts. The bulletin board and posts to be painted or have approved factory finish. The bulletin board to be always easily accessible and contain wage rates, equal opportunity notice, and other items required to be posted.
- B. Maintain the bulletin board in good condition throughout the life of the project. The bulletin board will remain the property of the Contractor and upon completion of the project be removed from the site and the premises restored to its prior condition.

## 1.5 CONSTRUCTION-USE UTILITIES

- A. Arrange with the local utility companies for gas, water, and electricity required for construction under this project and pay all costs in connection with them. The Contractor to, at its own expense, make all temporary connections and install distribution lines. All temporary lines to be maintained by the Contractor in a manner satisfactory to the COR and to be removed by in like manner before final acceptance of the construction.

## 1.6 TEMPORARY ELECTRIC

- A. Existing Electric can be used without submetering
- B. Removal: Remove all temporary equipment and materials upon completion of construction, repair all damage caused by the installation, and restore the premises to its prior condition.

## 1.7 TEMPORARY HEATING AND VENTILATION

- A. Provide cold weather protection and temporary heat and fuel as required to carry on the Work expeditiously during inclement weather, protect all work and materials against damage from dampness and cold, dry out the building, and provide suitable working conditions for the installation and curing of materials until final acceptance by the Contracting Officer. Refer to requirements in detailed specifications for temperatures to be provided and maintained for installation and curing of work under the various trades.
- B. Provide temporary heat consisting of smokeless heating appliances satisfactory to the COR. Furnish and pay for all necessary fuel and attendants in any trade and maintain temporary heat at temperatures adequate for the intended purpose.
- C. When the permanent heating system is operable and the Contractor elects to use it, the Contractor to provide all fuel, labor, materials, services, equipment, and attendants necessary to operate the permanent heating system for temporary heat and to maintain a minimum temperature as specified in the terms and conditions of the contract provisions and clauses, including those concerning *Heat*. If the permanent system is used to provide temporary heating and ventilation, the Contractor to replace all filters and restore the system to a condition satisfactory to the COR.

## 1.8 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire-protection facilities and equipment of sufficient size and types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
- B. Prohibit smoking outside of areas designated by USPS.
- C. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
- D. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review requirements with USPS personnel and local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
- E. Take all precautions to prevent possibility of fire resulting from construction operations. Particularly avoid hazardous accumulations of rubbish and unsecured, flammable materials.
- F. Provide emergency fire extinguishing equipment of adequate type and quantity, readily available and properly maintained.

## 1.9 TEMPORARY FIRST AID FACILITIES

- A. Provide adequate first aid facilities and equipment for construction personnel.

## 1.10 TEMPORARY WATER

- A. Provide and maintain a temporary water supply system for building purposes, extending branches to convenient points, and terminating them with a proper stop and hose connection. Before any paving is laid, the temporary supply to be removed and the tap in the main supply properly capped.

## 1.11 SANITARY PROVISIONS

- A. Provide and keep in neat and sanitary condition conveniences and accommodations for the use of the construction personnel necessary to comply with the requirements and regulations of the local department of health and of other bodies having jurisdiction.

## 1.12 APPROACHES AND EXITS

- A. Provide all necessary approaches and exits required to properly execute the Work.
- B. In connection with these, provide for temporary drainage to always keep the site free from standing water at all times.

## 1.13 TEMPORARY BARRIERS AND ENCLOSURES

- A. All construction activities are required to be secured and separated from areas accessible to the public and USPS operations. Construct all temporary barricades, enclosures, fences, and components for their specific and intended use, and to meet local code requirements, including wind load design.
- B. Coordinate the placement of barriers and enclosures that impact fire pull boxes, lighting, CCTV cameras, fire suppression systems, and exit doors with the COR and designated facility personnel at least two weeks in advance of barricade installation.
- C. Cover interior and exterior windows facing the construction with 3/4-inch exterior grade plywood. Paper and plastic coverings are not acceptable.
- D. Caution tape, plastic chain, and traffic cones are not approved barriers, and may only be used in an emergency and must be replaced within 24-hours with an approved barricade.
- E. Provide dustproof temporary partitions from the floor to the underside of the deck or ceiling sufficient to separate construction areas from the rest of the building to reduce construction noise and prevent the migration of dust, dirt, and fumes beyond the construction area.
- F. Partition Construction: Enclose the construction area with 6-mil anti-static fire-retardant reinforced polyethylene sheeting supported by framework and be capable of resisting 0.5 pounds-per-square-foot of force applied over the entire surface of each side, separately. Overlap the sheeting at least 6 inches and seal continuously with anti-static fire-retardant reinforced tape.
- G. Partition Construction: Studs at 16 inches on center braced as necessary, with 3/4-inch plywood [over 6-mil anti-static fire-retardant reinforced polyethylene sheeting] screwed to the studs on the non-



construction side of the partition. [Overlap the sheeting at least 6 inches and seal continuously with anti-static fire-retardant reinforced tape.]

- H. Partition Construction: Studs at 16 inches on center, 8 feet high, braced as necessary, with 3/4-inch plywood screwed to the studs on the non-construction side of the partition. From the top of the stud wall to the underside of the deck or ceiling, enclose the construction area with 6-mil anti-static fire-retardant reinforced polyethylene sheeting supported by framework and be capable of resisting 0.5 pounds-per-square-foot of force applied over the entire surface of each side, separately. Overlap the sheeting at least 6 inches and seal continuously with anti-static fire-retardant reinforced tape.
- I. Protect existing floor and finish flooring material beneath panels and within the construction area shall with 1/4-inch hardboard over 6-mil anti-static fire-retardant reinforced polyethylene sheeting. Overlap the sheeting at least 6 inches and seal with anti-static fire-retardant reinforced tape.

#### 1.14 POSTAL SERVICE FIELD OFFICE

- A. Within 30 days after receiving a Notice to Proceed, furnish a building or trailer to serve as a USPS temporary field office reserved for Postal Service use only. Locate where directed. Furnish and maintain drinking water facilities, adequate lighting, ventilation, heating, air-conditioning equipment, a copy machine, and a partition-enclosed chemical toilet. Provide hook-up to utility services and telephone services and pay the cost of all services except long-distance phone calls. Used field office buildings and used furniture and equipment in good condition are acceptable. Equip entrance doors with a substantial lock. Provide janitorial services. If a building is provided, it will be constructed to be easily moved, and relocate the building twice during the contract, if directed to do so. All-weather vehicle and pedestrian access and all-weather parking areas for six cars to be provided at the field office location. The temporary field office, including furniture, except for any office equipment including computers, printers, FAX machines, etc., to remain the property of the Contractor and be removed from the site after the Work is completed. The premises will be restored to its prior condition.
- B. Detailed List of Furnishings and Equipment: See Attachment at the end of this section for a list of equipment to be included in the USPS field office.

#### 1.15 PROJECT PHOTOS

- A. Provide photographs of the Work with the intended purpose of illustrating, generally, the work in place at specific points in time. Per the requirements set by Patriot Construction Management
  1. Frequency: Daily
  2. Media: uploaded to Procore
  3. Number: Minimum of 10.
  4. Content: Relevant to scope of work.

### PART 2 – PRODUCTS

NOT USED

### PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

SECTION 015600  
TEMPORARY BARRIERS AND ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide barriers and enclosures to protect the Work, existing facilities, and USPS operations from unauthorized entry, vandalism, and theft, and as required to complete the Work and to comply with OSHA and other applicable regulations.
- B. Maintain temporary barriers and enclosures in a proper, safe condition for the duration of the Contract. Before completion of the Work, remove temporary work in their entirety and restore the premises to its prior condition.

1.2 RELATED SECTIONS

- A. Section 013300 - Submittal Procedures
- B. Section 015000 - Temporary Facilities and Controls.

1.3 SUBMITTALS

- A. Temporary Barrier and Enclosure Plan: Plan to include the types and positions of temporary barriers and enclosures for every phase of the work, illustrate egress pathways, and indicate the location doors and gates, fire watch windows, and required signage.
- B. Temporary Barrier and Enclosure Details: Indicate materials, construction, and anchoring systems.
- C. Modify and resubmit all plans and details should the actual placement and construction of the barriers and enclosures substantially change during construction of the Work.
- D. Product Data:
  - 1. Anti-static fire-retardant reinforced polyethylene sheeting
  - 2. Woven opaque polypropylene panels
  - 3. Temporary interior horizontal protection system.

1.4 GENERAL REQUIREMENTS

- A. All construction activities are required to be secured and separated from areas accessible to the public and USPS operations.
- B. Design and construct all temporary barricades, enclosures, fences, and components for their specific and intended use, and to meet local code requirements, including wind load design.
- C. Construct temporary barriers and enclosures with the least possible obstruction and inconvenience to USPS operations and occupants, and the public.
- D. Construct and maintain temporary barriers and enclosures to be straight, clean, and uniform in appearance. Inspect barriers and enclosures daily and replace or repair substantially damaged materials immediately.
- E. Coordinate the placement of barriers and enclosures that impact fire pull boxes, lighting, CCTV cameras, fire suppression systems, and exit doors with the COR and designated facility personnel at least two weeks in advance of barricade installation.
- F. Barricades and fences that are used for traffic guardrails, or to protect against falls, shall be designed to resist an overturning moment created by the force of 50 pounds per lineal foot applied

horizontally at the height of 3 feet 6 inches perpendicular to the partition for the full length of the partition, or as required by code.

- G. Cover interior and exterior windows facing the construction with 3/4-inch exterior grade plywood. Paper and plastic coverings are not acceptable.
- H. Caution tape, plastic chain, and traffic cones are not approved barriers, and may only be used in an emergency, and must be replaced within 24-hours with an approved barricade.

#### 1.5 TEMPORARY SITE BARRICADES AND FENCES

- A. Use exterior chain link fencing to enclose the construction site. Use only easily movable barricades in locations needed for equipment, personnel, and emergency vehicle access.
- B. Barricades used to close off previously active vehicle roadways will have red flashing lights mounted 4 feet above the road surface, 5 feet on center across the width of the roadway.
- C. Provide chain link gates construction vehicles entrances and exits. Chain and padlock gates tightly at all times when not in use.
- D. Construction Fencing: 8 foot chain link with posts set in moveable bases held in place with weights sufficient to prevent overturning. Fence mesh fabric constructed of minimum 9-gauge steel wire with a maximum mesh opening of 2 inches.

#### PART 2 - PRODUCTS

Not Used

#### PART 3 - EXECUTION

Not Used

END OF SECTION

USPS Specification

## SECTION 016000

### PRODUCT REQUIREMENTS

#### PART 1 – GENERAL

##### 1.1 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Refer to contract provisions and clauses:
  - 1. Provision 2-7, Brand Name or Equal.
  - 2. Clause F-401, Optional Materials or Methods.
- B. Provide Products that comply with Contract Documents, which are undamaged and new at time of installation.
- C. Provide Products complete with accessories, fasteners, trim, finish, safety guards, and other devices and details needed for complete installation and intended use and effect.
- D. Substitutions may be considered if:
  - 1. An equal product was proposed during the solicitation and was accepted, in writing, by the Postal Service prior to award of the Contract.
  - 2. During the Work a Product becomes unavailable and the Contractor:
    - a. Represents that the proposed substitute Product has been investigated and it has been determined that it is equal or superior in all respects to that specified.
    - b. Will provide the same guarantee for the substitution that he would for that specified; and
    - c. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects, at no additional cost to the Postal Service and at no extension to Contract Time.

##### 1.2 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle Products in accordance with manufacturer's instructions, using means and methods that will prevent damage, deterioration, and loss, including theft.
- B. Schedule Product delivery to minimize long-term storage at Project site and prevent overcrowding of construction spaces.
- C. Coordinate Product delivery with installation schedule to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- D. Deliver Products to Project site in undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- E. Promptly inspect shipments to ensure that Products comply with project requirements, quantities are correct, Products are undamaged, and properly protected.
- F. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

##### 1.3 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect Products in accordance with manufacturers' published instructions, with seals and labels intact and legible.

- B. Store Products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's published instructions.
- C. For exterior storage of fabricated Products, place on sloped supports, above ground.
- D. Provide off-site storage and protection when Project site does not permit on-site storage or protection.
- E. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of Products.
- F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification

## SECTION 017300

### EXECUTION

#### PART 1 – GENERAL

##### 1.1 LAYOUT OF WORK

- A. The Contractor must lay out its work from Postal Service-established base lines and benchmarks indicated on the drawings and is responsible for all measurements based on them. The Contractor must furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor as may be required in laying out any part of the work from the base lines and benchmarks established by the Postal Service. The Contractor is responsible for the execution of the work to those lines and grades established or indicated by the COR.

##### 1.2 CONTRACTOR'S TEMPORARY USE OF FACILITIES AND EQUIPMENT

- A. No new facilities or equipment intended for the permanent installation, including materials-handling vehicles, may be used for temporary purposes unless specified in the Contract or unless the Contractor has the written permission of the COR.

##### 1.3 FOR CONTRACT WORK PERFORMED IN AN EXISTING OCCUPIED POSTAL FACILITY

- A. The Postal Service will continue to operate the facility during performance of the work. Accordingly, the Contractor must arrange and schedule contract work to facilitate such continued use of the site and building, with minimal disruption to Postal operations. Contract work that cannot be performed during normal Postal operating hours and must be performed after hours or during periods when the facility is normally closed, must be coordinated with the COR.
- B. If contract work is being performed on the roof, or above or near electronic equipment or mail processing equipment, Contractor must provide temporary interior protection above and/or around such equipment as appropriate or as indicated in construction documents. Interior protection shall be anti-static 6-mil poly. Remove temporary protection upon completion of the work. Coordinate interior protection with local management.

##### 1.4 CLEANING

- A. Refer to the terms and conditions of the contract provisions and clauses, including those clauses *Debris and Clean Up*.
- B. Cleaning During Construction:
  1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
  2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
  3. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
  4. Collect and remove waste materials, debris, and rubbish from site as specified in the Environmental Compliance and Management Plan as required in Section 013543 - Environmental Procedures.

C. Final Cleaning:

1. Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces.
2. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's published instructions.
3. Complete following cleaning operations before requesting COR inspection for Substantial Completion.
  - a. Clean Project Site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas broom clean. Remove petro-chemical spills, stains, and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.
  - b. Remove tools, construction equipment, machinery, and surplus material from Project Site.
  - c. Remove snow and ice to provide safe access to building.
  - d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  - f. Broom clean concrete floors in unoccupied spaces.
  - g. Provide final cleaning, waxing, and buffing of resilient tile, in accordance with manufacturer's requirements.
  - h. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. Shampoo if required.
  - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
  - j. Remove labels that are not permanent labels.
  - k. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored, or that show evidence of repair or restoration. Do not paint over "UL" and similar labels, including mechanical and electrical name plates.
  - l. Wipe surfaces of mechanical and electrical equipment, and other similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.
  - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - n. Replace air disposable filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills. Clean ducts, blowers, and coils if units were operated without filters during construction.
  - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned out bulbs, and defective and noisy starters in fluorescent and mercury vapor fixtures.
  - p. Leave Project clean and ready for occupancy.
4. Engage an experienced licensed exterminator to make a final inspection, and rid Project of rodents, insects, and other pests. Comply with regulations of local authorities having jurisdiction.
5. Remove temporary protection and facilities installed during construction to protect previously completed installations during remainder of construction.
6. Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from Project Site and dispose of in accordance with requirements of local authorities having jurisdiction.
7. Where extra materials of value remain after completion of construction, they become Postal Service property and these materials should be stored as directed by COR.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification



## SECTION 017419

### CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes: Procedures for achieving the most environmentally conscious Work feasible within the limits of the Construction Schedule, Contract Sum, and available materials, equipment, and products.
  - 1. Participate in promoting efforts of Postal Service to create an energy-efficient and environmentally-sensitive structure.
  - 2. Use recycled-content, toxic-free, and environmentally-sensitive materials and equipment.
  - 3. Use environmentally-sensitive procedures.
    - a. Protect the environment, both on-site and off-site, during demolition and construction operations.
    - b. Prevent environmental pollution and damage.
    - c. Effect optimum control of solid wastes.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 013200 - Construction Progress Documentation.
  - 2. Section 014000 - Quality Requirements: Contractor's Daily Report.
  - 3. Section 015000 - Temporary Facilities And Controls: Temporary ventilation, progress cleaning and waste removal.
  - 4. Section 016000 - Product Requirements: Substitutions.
  - 5. Section 017704 – Closeout Procedures and Training: Record submittals.
  - 6. Section 024113 – Selective Site Demolition.

##### 1.2 DEFINITIONS

- A. Adequate ventilation: Ventilation, including air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of dust fumes, vapors, or gases.
- B. Construction and demolition waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.
  - 1. Rubbish: Includes both combustible and noncombustible wastes but excludes recyclable materials such as paper, boxes, glass, metal, lumber scrap and metal cans.
  - 2. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings, stumps and rubble that result from construction or maintenance and repair work.
- C. Chemical waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
- D. Diversion: Redirection of waste ordinarily deposited in a municipal landfill to a recycling facility or to another destination for reuse.
- E. Environmental pollution and damage: The presence of chemical, physical, or biological elements or agents, which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

- F. Hazardous materials: Includes pesticides, biocides, and carcinogens as listed by recognized authorities, such as the Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (IARC).
- G. Interior final finishes: Materials and products that will be exposed at interior, occupied spaces; including flooring, wallcovering, finish carpentry, and ceilings.
- H. Municipal Solid Waste Landfill: A permitted facility that accepts solid, non-hazardous waste such as household, commercial, and industrial waste, including construction and demolition waste.
- I. Packaged dry products: Materials and products that are installed in dry form and are delivered to the site in manufacturer's packaging; including carpets, resilient flooring, ceiling tiles, and insulation.
- J. Sediment: Soil and other debris that has been eroded and transported by storm or well production runoff water.
- K. Sanitary wastes:
  - 1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.
  - 2. Sewage: Domestic sanitary sewage.
- L. Wet products: Materials and products installed in wet form, including paints, sealants, adhesives, and special coatings.

### 1.3 SUBMITTALS

- A. Solid Waste Management and Environmental Protection Plan: Prepare and submit at the Preconstruction Meeting a Solid Waste Management and Environmental Protection Plan including, but not limited to, the following:
  - 1. Procedures for Recycling/Re-Use Program.
  - 2. Schedule for application of interior finishes.
  - 3. Revise and resubmit Solid Waste Management and Environmental Protection Plan as required by Postal Service.
    - a. Approval of the Contractor's Solid Waste Management and Environmental Protection Plan, will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.
  - 4. Any permits required by local, state or federal agencies.
- B. With each Contractor's Report as specified in Section 014000 – Quality Requirements, submit an updated Summary Of Solid Waste Disposal And Diversion. Submit on form in Appendix A of this Section. Include manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material for:
  - 1. Municipal Solid Waste Landfills.
  - 2. Recycling/Reuse Facilities.
- C. With Record Submittals as specified in Section 017704 - Closeout Procedures and Training, submit the following:
  - 1. Final Summary Of Solid Waste Disposal And Diversion. Submit on form in Appendix A of this Section.
  - 2. Resource Conservation and Recovery Act Project Summary. Submit on form in Appendix B of this Section.

## PART 2 – PRODUCTS

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NOT USED

## PART 3 – EXECUTION

### 3.1 RECYCLING AND REUSE

- A. Collection: Implement a recycling/reuse program that includes separate collection of waste materials of the following types as appropriate to authorized local and regional recycling/reuse facilities:
1. Asphalt.
  2. Concrete.
  3. Metal.
    - a. Ferrous.
    - b. Non-ferrous.
  4. Wood.
  5. Debris.
  6. Glass.
  7. Clay brick.
  8. Paper/Cardboard.
  9. Plastic.
  10. Gypsum.
  11. Paint.
  12. Carpet.
  13. Others as appropriate.
- B. Recycling/reuse centers: Contact state and/or local governmental solid waste offices, Environmental Protection Agency (EPA) regional offices, and authorized applicable non-profit organizations.
1. Asphalt
  2. Concrete.
  3. Metal.
  4. Wood.
  5. Debris.
  6. Glass.
  7. Clay brick.
  8. Paper/Cardboard.
  9. Plastic.
  10. Gypsum.
  11. Paint.
  12. Carpet.
  13. Others as appropriate.
- C. Handling:
1. Clean materials which are contaminated prior to placing in collection containers. Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
  2. Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- D. Participate in re-use programs: identify local and regional re-use programs, including but not limited to non-profit organizations such as schools, local housing agencies, and public arts programs, that accept used materials. The following are examples for Contractor's information only.
1. National materials exchange network, such as CAL-MAX, a free service provided by various state and regional offices, designed to help businesses find markets for materials that traditionally would be discarded. The premise of the program is that material discarded by one business may be a resource for another business.

- a. Items and regions covered by materials exchange programs may vary. Contact the applicable regional materials exchange program. In California, contact CAL-MAX at (916) 255-2369.
  - 2. Habitat For Humanity, a non-profit housing organization that rehabilitates and builds housing for low income families.
    - a. Sites requiring donated materials vary. Contact the national hotline (800) HABITAT.
- E. Rebates, tax credits, and other savings obtained for recycled or re-used materials accrue to Contractor.

### 3.2 ENVIRONMENTAL CONTROLS

- A. Protection of natural resources: Preserve the natural resources within the Project boundaries and outside the limits of permanent Work performed under this Contract in their existing condition or restore to an equivalent or improved condition as approved by Postal Service, upon completion of the Work.
  - 1. Confine demolition and construction activities to work area limits indicated on the Drawings and as directed by COR.
    - a. Temporary construction: As specified in Section 015000 - Temporary Facilities And Controls.
    - b. Demolition and salvage operations: As specified in Section 024119 - Selective Structure Demolition.
    - c. Disposal operations for demolished and waste materials that are not identified to be salvaged, recycled or reused:
      - 1) Remove debris, rubbish, and other waste materials resulting from demolition and construction operations, from site.
      - 2) No burning permitted.
      - 3) Transport materials with appropriate vehicles and dispose off-site to areas which are approved for disposal by governing authorities having jurisdiction.
      - 4) Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways. Remove spillage and sweep, wash, or otherwise clean project site, streets, or highways.
      - 5) Comply with applicable federal, state and/or local regulations.
  - 2. Water resources as follows:
    - a. Comply with requirements of the National Pollutant Discharge Elimination System (NPDES) and the State Pollutant Discharge Elimination System (SPDES).
    - b. Oily substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water.
      - 1) Store and service construction equipment at areas designated for collection of oil wastes.
    - c. Mosquito abatement: Prevent ponding of stagnant water conducive to mosquito breeding habitat.
    - d. Prevent run-off from site during demolition and construction operations.
  - 3. Land resources: Prior to construction, identify land resources to be preserved within the Work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from Postal Service.
  - 4. Air Resources: Prevent creation of dust, air pollution, and odors.
    - a. Use water sprinkling, temporary enclosures, and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
      - 1) Do not use water when it may create hazardous or other adverse conditions such as flooding and pollution.

- b. Do not use any hazardous chemicals on USPS property when it is a shared work space with USPS employees. If chemicals are authorized for use, store volatile liquids, including fuels and solvents, in closed containers.
- c. Properly maintain equipment to reduce gaseous pollutant emissions.
- d. Interior final finishes: Schedule construction operations involving wet products prior to packaged dry products to the greatest extent possible in accordance with Postal Service approved Solid Waste Management and Environmental Protection Plan.
- e. Temporary Ventilation:
  - 1) Provide adequate ventilation during and after installation of interior wet products and interior final finishes.
  - 2) Provide adequate ventilation of packaged dry products prior to installation. Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues. Provide a temperature range of 60 degrees F minimum to 90 degree F maximum continuously during the ventilation period. Do not ventilate within limits of Work unless otherwise approved by the COR.
- f. Pre-occupancy ventilation: After final completion and prior to initial occupancy, provide adequate ventilation for minimum 5 days. Pre-occupancy ventilation procedures:
  - 1) Use supply air fans and ducts only.
  - 2) Temporarily seal exhaust ducts.
  - 3) Temporarily disable exhaust fans.
  - 4) Provide exhaust through operable windows or temporary openings.
  - 5) Provide temporary exhaust fans as required to pull exhaust air from deep interior locations. Stair towers may be used for exhausting air from the building during the temporary ventilation.
  - 6) After pre-occupancy ventilation and prior to final testing and balancing of HVAC system, replace air filters and make HVAC system fully operational.
- 5. Fish and Wildlife Resources: Manage and control construction activities to minimize interference with, disturbance of, and damage to fish and wildlife.
- 6. Noise Control: Perform demolition and construction operations to minimize noise. Perform noise producing work in less sensitive hours of the day or week as directed by Postal Service .
  - a. Repetitive, high level impact noise will be permitted only between the hours of 8:00 a.m. and 6:00 p.m. Do not exceed the following dB limitations:

<u>Sound Level in dB</u>	<u>Time Duration of Impact Noise</u>
70 .....	More than 12 minutes in any hour
80 .....	More than 3 minutes in any hour

- b. Provide equipment, sound-deadening devices, and take noise abatement measures that are necessary for compliance.

END OF SECTION

Attachment A

SUMMARY OF SOLID WASTE DISPOSAL AND DIVERSION

Project Name: \_\_\_\_\_ FMS Project Number: \_\_\_\_\_  
 Contractor Name: \_\_\_\_\_ License Number: \_\_\_\_\_  
 Contractor Address: \_\_\_\_\_

<b>Solid Waste Material</b>	<b>Date Material Disposed/ Diverted</b>	<b>Amount Disposed/ Diverted (ton or cu. yd)</b>	<b>Municipal Solid Waste Facility (name, address, &amp; phone number)</b>	<b>Recycling/Reuse Facility (name, address, &amp; phone number)</b>	<b>Comments (if disposed, state why not diverted)</b>
Asphalt					
Concrete					
Metal					
Wood					
Debris					
Glass					
Clay brick					
Paper/ Cardboard					
Plastic					
Gypsum					
Paint					
Carpet					
Other:					

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

Attachment B

RESOURCE CONSERVATION AND RECOVERY ACT - PROJECT SUMMARY

Project Name: \_\_\_\_\_ FMS Project Number: \_\_\_\_\_  
Contractor Name: \_\_\_\_\_ License Number: \_\_\_\_\_  
Contractor Address: \_\_\_\_\_

1.0 EPA GUIDELINE ITEMS

A. Fly Ash:

1. Total dollar amount of concrete and cement provided for this project.  
\$ \_\_\_\_\_.
2. Total dollar amount of concrete and cement containing fly ash provided for this project.  
\$ \_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of concrete and cement containing fly ash provided for this project? \_\_\_\_\_
  - a. If yes, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

B. Building Insulation Products:

1. Total dollar amount of building insulation products provided for this project.  
\$ \_\_\_\_\_.
2. Total dollar amount of building insulation products containing recycled materials provided for this project. \$ \_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of building insulation products containing recycled materials provided for this project? \_\_\_\_\_
  - a. If yes, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

C. Carpet:

1. Total dollar amount of carpet provided for this project. \$ \_\_\_\_\_.
2. Total dollar amount of carpet containing recycled materials provided for this project.  
\$ \_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of carpet containing recycled materials provided for this project? \_\_\_\_\_
  - a. If yes, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

D. Floor Tiles (resilient):

1. Total dollar amount of floor tile (resilient) provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of floor tile (resilient) containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of floor tile (resilient) containing recycled materials provided for this project? \_\_\_\_\_.
  - a. If yes, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

E. Floor Tiles (ceramic):

1. Total dollar amount of floor tile (ceramic) provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of floor tile (ceramic) containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of floor tile (ceramic) containing recycled materials provided for this project? \_\_\_\_\_.
  - a. If yes, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

F. Hydraulic Mulch:

1. Total dollar amount of hydraulic mulch provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of hydraulic mulch containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of hydraulic mulch containing recycled materials provided for this project? \_\_\_\_\_.
  - a. If yes, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

G. Compost:

1. Total dollar amount of compost provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of compost containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of hydraulic mulch containing recycled materials provided for this project? \_\_\_\_\_.
  - a. If yes, please explain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

2.0 SPECIFICATIONS

NOT USED



3.0 SOLID WASTE PREVENTION

- A. Total dollar amount of solid waste disposed (landfill) for this project. \$\_\_\_\_\_.
- B. Total weight of solid waste disposed (landfill) for this project. \$\_\_\_\_\_.

4.0 RECYCLING

- A. Total dollar value of solid waste diverted from landfill and recycled or reused for this project. (Express as total dollar amount for solid waste disposal in landfill for equivalent type and amount of diverted waste.)  
\$\_\_\_\_\_.
- B. Total weight of solid waste diverted from landfill and recycled or reused for this project. (Express as total weight for solid waste disposal in landfill for equivalent type and amount of diverted waste.)  
Tons\_\_\_\_\_.

5.0 COMMENTS

- A. Comments and suggestions for increasing amount of recycled materials used in construction materials.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
- B. Comments and suggestions for improving solid waste prevention and recycling efforts during construction.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

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

## SECTION 017704

### CLOSEOUT PROCEDURES AND TRAINING

#### PART 1 – GENERAL

##### 1.1 MANUALS

- A. Purpose: Operation and maintenance manuals are for the training of, and use by, Postal Service employees in the operation and maintenance of the systems and related equipment as specified below. The manuals must consist of instruction on systems and equipment. A separate manual or chapter must be prepared for each of the following classes of equipment or system:
1. Landscaping.
  2. Roof system.
  3. Doors.
  4. Security system.
  5. Fire protection.
  6. Plumbing systems.
  7. Mechanical systems.
  8. Electrical systems.
  9. EV Chargers
  10. Miscellaneous building equipment and systems.
  11. Mechanization (for requirements for mechanization maintenance manuals, see Mechanization Specification M-5000).
- B. Content: Unless otherwise indicated, each chapter must contain the following, as applicable:  
Introduction.  
Table of contents.  
Description of system (including design intent and considerations).
- C. Preparation: The outline below is intended as a general guide for preparing the manuals. The manuals must be prepared to provide for the optimum operation and maintenance of the various systems. The description of systems and general operating instructions for plumbing and electrical manuals may cover only complicated or unusual parts of these systems, such as sewage ejectors, transformers, high tension switchgear, and signal and alarm systems. Manufacturer's literature and data must be those of the actual equipment installed under contract for the facility. Further guidance is available in the ASHRAE Handbook, 1984, Systems Volume, Chapter 39, Mechanical Maintenance.
- D. Suggested Outline for Operation and Maintenance (O&M) Manuals: This is a suggested outline, with general requirements of O&M manuals. The outline is presented to indicate the extent of material to be covered and the individual items required in manuals for Mail Processing Facilities. The outline may be modified to suit specific installations; however, the purpose of the manual must be fulfilled. The manual is not intended to duplicate manufacturers' data, but proper references must be made in the text of the O&M manual to indicate that that information is applicable and where it is located.
1. Part I. Description and Design Intent
    - a. Introduction
      - 1) Provide a brief description of project and purpose of the maintenance manual. The following statements must be included: "Operation and maintenance of this equipment must be performed in accordance with this manual and posted instructions, subject to compliance with applicable technical guides and standards issued by USPS. It is recognized that minor changes in control points and settings will be required, based on actual operating experience, to correct varying conditions and improve operation. When such changes appear

necessary, they must be submitted to the maintenance manager for consideration. Upon approval of any changes, the applicable portions of all copies of the manual and proposed instructions must be revised and reissued, and any change in operating procedure brought to the attention of all operating personnel."

- 2) "This manual is specifically developed to assist the Postal official in charge at the facility to operate and maintain the building systems and equipment. Manufacturers' recommendations set forth for certain components must be followed during the complete warranty period for that equipment."
  - 3) Contents of Manual. This portion of the introduction must explain that the manual is to contain complete operating, maintenance, and safety instructions for all equipment listed. It must also contain any other appropriate references as required to outline an explanation of the manuals and major categories of reference material required with the manuals.
- b. Table of Contents
- 1) The table of contents must list numbers and titles of chapters, sections, and main paragraphs, with their page numbers. Each volume in a set of manuals must contain its own table of contents. Publications containing 10 or more illustrations or tables must include a list of illustrations or tables, as applicable. These lists must show number, title, and page number of each illustration and table. Following is a typical table of contents:
    - a. Landscaping
      - 1.) Irrigation system
      - 2.) Lawns and grasses
      - 3.) Exterior plants
      - 4.) Plant maintenance
    - b. Roof System
      - 1.) Roof and flashing type
      - 2.) Local inspection (frequency and what is included)
      - 3.) Maintenance (when manufacturer performs, if USPS performs what methods compatible materials, etc.)
    - c. Doors
      - 1.) Overhead coiling doors
      - 2.) Folding closures
      - 3.) Sectional overhead doors
      - 4.) Impact traffic doors
      - 5.) Automatic entrance doors
      - 6.) Specialized hardware
    - d. Security Systems
      - 1.) CCTV system
      - 2.) Intrusion detection
      - 3.) Electronic article surveillance
      - 4.) Access control
    - e. Fire Protection System
      - 1.) Water supply and distribution
      - 2.) Exterior fire hydrants
      - 3.) Sprinklers
      - 4.) Fire Department connections
      - 5.) Fire extinguishers
      - 6.) Exit signs
    - f. Plumbing Systems
      - 1.) Potable water
      - 2.) Domestic hot water
      - 3.) Roof and sanitary drains

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- g. Mechanical Systems
    - 1.) Space conditioning
    - 2.) Heating
    - 3.) Central chilled water and distribution
    - 4.) HVAC instrumentation and controls
  - h. Electrical Systems
    - 1.) Incoming Service
    - 2.) Electrical power distribution
    - 3.) Lighting and lighting controls
    - 4.) Fire alarm
    - 5.) Emergency lighting unit
  - i. Miscellaneous Building Equipment
2. Part II. Operating Sequence and Procedures
- a. Contents: Each chapter must describe the procedures necessary for Postal Service personnel to operate the system and equipment covered in that chapter.
  - b. Operating Procedures: The operating procedures must be divided into four subsections: Startup, Operation, Emergency Operation, and Shutdown.
    - 1) Startup: Give complete instructions for energizing the equipment and making initial settings and adjustments whenever applicable. If equipment is fully automatic, a statement to that effect is all that is required. If a specific sequence of steps must be performed, give step-by-step instructions in the proper sequence. If timing- (such as warm-up between power-on and adjustment) is important, clearly state the specific minimum time required at the proper point in the procedure. Refer to controls and indicators by panel; make references consistent with the nomenclature used in illustrations and tables of controls and indicators. If preliminary settings differ for different modes of operations, give procedures for each mode.
    - 2) Operation: Give detailed instructions in proper sequence for each mode of operation. When, for a given action on the part of the operator, alternate equipment responses are possible, give the appropriate operation reaction to each.
    - 3) Emergency Operation: If some functions of the equipment can be operated while other functions are disabled, give instructions for operations under these conditions. Include here only those alternate methods of operation (from normal) that the operator can follow when there is a partial failure or malfunctioning of components, or other unusual condition.
    - 4) Shutdown: Include instructions for stopping and securing the equipment after operation. If a particular sequence is required, give step-by-step instructions in that order.
3. Part III. Maintenance Instructions and Requirements
- a. Contents: Each chapter must describe the procedures necessary for Postal Service personnel to perform the maintenance on the systems and equipment covered in that chapter. Emphasis must be placed on the method of mechanical control of systems and equipment from a maintenance standpoint. References must be made, as appropriate, to drawings, schematics, and sequences of operation included as part of the construction Contract drawings and specifications that show piping and equipment arrangements and items of control. Prints of these drawings must be reduced to 11 inches x 17 inches for insertion in the manuals. Drawings must represent the "as-built" condition.
  - b. Maintenance Procedures: The maintenance procedures must be divided into two categories: Preventive Maintenance and Corrective Maintenance.
    - 1. Preventive Maintenance
      - a. Provide a schedule for preventive maintenance. State, preferably in tabular form, the recommended frequency of

- performance for each preventive maintenance task (cleaning, inspection, and scheduled overhauls).
  - b. Provide instruction and schedules for all routine maintenance cleaning and inspection, with recommended lubricants.
  - c. If periodic inspection of equipment is required for operation, cleaning, or other reasons, indicate the items to be inspected and give the inspection criteria. following:
    - 1
    - 2. Provide instruction for minor repairs or adjustments required for preventive maintenance routines. Minor repair and adjustment must be limited to repairs and adjustments that may be performed without special tools or test equipment and that require no special training or skills. Identify test points and give values for each.
- c. Corrective Maintenance
  - 1. Corrective Maintenance: Corrective maintenance instructions must be predicated upon a logical effect-to-cause troubleshooting philosophy and a rapid replacement procedure to minimize equipment downtime. Instructions and data must appear in the normal sequence of corrective maintenance, for example, troubleshooting first, repair and replacement of parts second, and then the parts list.
  - 2. Troubleshooting: This information must describe the general procedure for locating malfunctions and must give, in detail, any specific remedial procedures or techniques. The data shown are intended to isolate only the most common equipment deficiencies. Troubleshooting tables, charts, or diagrams may be used to present specific procedures. A guide to this type must be a three-column chart. The columns must be entitled Malfunction, Probable Cause, and Recommended Action. The information must be alphabetically arranged by component, and each component must, in turn, list deficiencies that may be expected. Each deficiency must contain one or more problems with a recommended correction.
  - 3. Repair and Replacement: Indicate the repair and replacement procedures most likely to be required in the maintenance of the equipment. Information included here must consist of step-by-step instructions for repair and replacement of defective items. Include all information required to accomplish repair or replacement, including information such as torque values. Identify all tools, special equipment, and materials that may be required. Identify uses for maintenance equipment. The paragraphs must contain headings to identify the topics covered.
  - 4. Safety Precautions: This subsection must comprise a listing of safety precautions and instructions to be followed before, during, and after repairs or adjustments are made or routine maintenance is performed.
- d. Manufacturers' Brochures: Include manufacturers' descriptive literature covering devices used in the system, together with illustrations, exploded views, and renewal parts lists. This section must also include special devices manufactured by the Contractor.
- e. Special Maintenance: Provide information of a maintenance nature covering warranty items that have not been discussed elsewhere.
- f. Shop Drawings: Provide a copy of all approved shop drawings covering approval of equipment for the project with the manufacturers' brochures.
- g. Spare Parts Lists: Include a recommended spare parts list for all equipment furnished for the project. The parts list must include a tabulation of descriptive data for all the electrical-electronic spare parts and all the mechanical spare parts proposed for each type of equipment or system. Each part must be properly identified by part number and manufacturer.

- h. Warranty: Include a copy of the "special" or extended warranty in the operation and maintenance manual.
- E. Submittal, in both "hard" and electronic DVD or CD-ROM format (flash drives are not permitted):
  - 1. Preliminary Submittal: Two draft copies of the completed manuscript for items in this outline must be submitted to the COR for review within 60 days after approval of equipment to be provided. One copy will be returned to the Contractor within 30 days after submittal and, if required, must be revised, and resubmitted within 15 days.
  - 2. Final Submittal: four complete sets of manuals must be furnished to the COR not later than 30 days before completion of the project.
  - 3. Final Submittal must be accepted by the COR before training can begin.

## 1.2 POSTED OPERATING INSTRUCTIONS

- A. General. Operating instructions and diagrams must be prepared for posting near the equipment. Posted operating instructions must be photographic or equal non-fading reproductions framed under glass or encased in non-discoloring plastic and must be mounted in locations as directed. Copies of the posted operating instructions must also be used with the O&M manuals as a basis for training Postal Service personnel in the operation and maintenance of systems and related equipment installed under contract at the facility.
- B. Posted operating instructions must consist of simplified, consolidated equipment, control, and power diagrams graphically representing the entire system and actual equipment installed, including concise written instructions on how to start and stop systems, what settings and conditions are to be observed, and what control adjustments are to be made or maintained by the operation. Posted operating instructions must include, but are not limited to the following:
  - 1. Boiler and burner controls.
  - 2. Refrigeration controls.
  - 3. Heating, ventilating, and air-conditioning controls for each system.
  - 4. Controls for dust collection systems.
  - 5. One-line schematic diagrams of water supply (plumbing).
  - 6. One-line diagrams of steam distribution and hot water and chilled water systems, including risers, main shutoff valves, balancing cocks, and the like.
  - 7. One-line isometric diagrams of sanitary drainage.

## 1.3 TRAINING

- A. The Contractor must train Postal Service personnel in the operation and maintenance of mechanical and electrical equipment. Coordination must be maintained with systems designers for developing the hours of instruction and scope of material to be covered. Training of Postal Service personnel must not begin until the COR has approved the final submittal copy of each O&M manual.
- B. Schedule Submittal: The proposed scope of training and materials and instruction schedule must be submitted for review and approval approximately 30 days before the scheduled completion of the buildings. Mutually agreeable dates for training must be arranged with the COR, but the training must be completed before final acceptance of the facility.
- C. Scope of Training: Training must include classroom and on-the-job instructions by qualified installation and maintenance personnel having the necessary knowledge, experience, and teaching skills. The use of recording on digital media (DVD or CD discs; flash drives are not permitted) during the instruction period is required. Discs must be turned over to the COR after training has D.  
Time Period of Training: The minimum specific hours of training time required for each category of major equipment and systems is indicated below. Experience indicates a workable ratio in the vicinity of approximately 25 percent classroom to 75 percent application, except that the ratio may be reversed for control systems. The COR must have the option of redistributing the

training times, subject to the total time specified. Training must be presented on an 8-hour per day, 5-day per week schedule, with all reading assignments and review to be within this period.

1.4 TRAINING PERIOD Verify with Patriot Construction Management for hours required.

Item	Time (Hours)
1. Roofing	
2. Special Doors	
3. Dock Equipment	
4. Security Equipment	
5. Heating Plant Covers heat-generating equipment, such as heat exchangers, boilers, and burners; electric resistance heating; and related equipment, where applicable (including combustion testing), together with associated operation and safety controls.	
6. Cooling Plant Covers the refrigeration plant, cooling tower (including water treatment), and related equipment, together with associated operating and safety controls.	
7. Ventilation Covers air-handling units with heating and cooling coils, fans, and all other air-handling equipment, together with associated operating and limit controls.	
8. Overall Control System Covers central control center, coordinating respective controls of heating, cooling, and ventilation systems, and shows how these controls work together to provide an integrated overall control of the complete air-conditioning system, both heating and cooling, as well as all other utility control systems.	
9. Electrical System Covers all building services, lighting, lighting controls, and intercommunications, and security system.	
10. Piping and Plumbing Includes, but is not limited to, domestic water supply, storm and sanitary drainage systems, cold-water supply systems, sprinkler systems, and the like.	

1.5 TRAINING PARTICIPATION SHEETS

- A. Submit to the COR sign-in sheets with the dates and names of all training participants. Training sheets must be reviewed and certified by an authorized facility manager.

1.6 OTHER CLOSEOUT SUBMITTALS

- A. Additional requirements for Systems Manuals, Operating Instructions, Training, and other deliverables are contained in individual Specification Sections. All closeout requirements must be provided to and accepted by the COR prior to requesting final payment. Examples of additional closeout requirements include, but are not limited to, the following.
1. Final Punch-List with all items certified as complete.
  2. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Record "As Built" Drawings*, the Contractor shall submit certified As-Built Record Drawings and Specifications in the quantities and media specified.

3. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Warranty*, the Contractor shall submit all transferable guarantees and warranties for equipment, materials and installations furnished by any manufacturer, supplier, or installer.
4. Signed Asbestos and Lead-Based Paint Certificate.
5. RE-4 Certification of Accessibility (CoA) and Facility Accessibility Survey Report.
6. Material Safety Data Sheets.
7. Signed and sealed Contractor Release of Claims.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

USPS Specification



## SECTION 024119

### SELECTIVE STRUCTURE DEMOLITION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Procedures for demolition and removal of existing building elements.
  - 2. Removal of designated building equipment and fixtures.
  - 3. Salvaged items.
  - 4. Salvaged material.
  - 5. Salvaged items for re-use.
- B. Related Documents: The Contract Documents, as defined in Section 011000- Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 013543 - Environmental Procedures: Recycling and reuse of waste materials.
  - 2. Section 024113 - Selective Site Demolition.

##### 1.2 SYSTEM DESCRIPTION

- A. The extent of Selective Demolition Work is that Work necessary, and required to facilitate the new construction indicated.
- B. Demolition shall be such that all construction, new and existing, can be performed, and completed in accordance with the construction documents.
- C. The contractor shall visit the project site and familiarize himself with the existing conditions and project requirements.
- D. Verify the scope of the Work under this Section including salvage material. The United States Postal Service will be responsible for removing all materials and equipment which the United States Postal Service wishes to salvage prior to the beginning of this Work.
- E. The existing fire protection sprinkler system shall remain in place.

##### 1.3 QUALITY ASSURANCE

- A. Engage only personnel who can demonstrate not less than five years successful experience in Work of similar character.
- B. Performance Criteria:
  - 1. Requirements of Structural Work: Do not cut structural work in a manner resulting in a reduction of load-carrying capacity of load/deflection ratio.
  - 2. Operational and Safety Limitations: Do not cut operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in a manner intended or resulting in a decreased operational life, increased maintenance or decreased safety.

3. Visual Requirements: Do not cut work which is exposed on the exterior or exposed in occupied spaces of the building in a manner resulting in a reduction of visual qualities or resulting in substantial evidence of the demolition work judged by the Architect to be cut and patched in a visually unsatisfactory manner.
4. Loading: Do not superimpose loads at any point upon existing structure beyond design capacity including loads attributable to materials, construction equipment, demolition operations and shoring and bracing.
5. Vibration: Do not use means, methods, techniques or procedures which would induce vibration into any element of the structure.
6. Fire: Do not use means, methods, techniques or procedures which would produce any fire hazard unless otherwise approved by Contracting Officer.
7. Water: Do not use means, methods, techniques or procedures which would produce excessive water run-off, and water pollution.
8. Air Pollution: Do not use means, methods, techniques or procedures which would produce uncontrolled dust, fumes or other damaging air pollution.

#### 1.4 PROJECT SITE

- A. Indicated "Existing Construction" was obtained from existing drawings or other information which may not reflect actual conditions. The Contractor shall verify all existing conditions and notify the Contracting Officer of discrepancies before proceeding with the Work.
- B. Perform the removal, cutting, drilling, etc., of existing work with extreme care, and using small tools in order not to jeopardize the structural integrity of the building.
- C. Occupancy: Contractor shall coordinate with Patriot Construction Management for use of the facility during construction.
- D. Condition of Structure: The United States Postal Service assumes no responsibility for the actual condition of portions of the structure to be demolished.
- E. Partial removal: Items of salvageable value to the Contractor may be removed from the structure as the work progresses if not claimed by the United States Postal Service. Salvaged items must be transported from the site as they are removed.
- F. Protection: Make sure that the safe passage of persons around the area of demolition is maintained during the demolition operation. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

#### 1.5 PROTECTION OF EXISTING CONSTRUCTION

- A. Provide temporary protection of existing construction (floors, roof, and walls) when adjoining new work and in traffic areas.
- B. Provide temporary construction, constructed of framing and plywood, to protect existing construction and surrounding surfaces from damage by movement of materials and personnel.
- C. The contractor is responsible for all damage to existing structure and shall replace or repair all areas of damage.
- D. Repair, replace, or rebuild existing construction as required or as directed which has been removed, altered, or disrupted to allow for new construction. Existing construction shall be corrected to match adjacent construction, new or existing.

- E. Perform cutting of existing concrete and masonry construction with saws and core drills. Do not use jack-hammers or explosives.

## 1.6 SHORING AND BRACING

- A. Provide temporary shoring of existing construction to allow removal of existing structural elements. Maintain shoring until new structural elements are in place and accepted.

## PART 2 - PRODUCTS

### 2.1 SALVAGED ITEMS

- A. The Contract Documents indicate the existing materials that are to be reinstalled in the new construction. The Contractor shall remove, protect and reinstall these items as indicated.
  - 1. Items for "Reinstallation" will be indicated as such within the Contract Documents.
- B. Materials scheduled for reinstallation which are damaged by the Contractor to the extent that they cannot be reinstalled shall be replaced by the Contractor with equal quality material at no additional cost to the United States Postal Service.
- C. Coordinate with the Contracting Officer on disposition of salvage items note scheduled for reinstallation, demolished materials, and equipment. Salvaged materials, not reinstalled, shall be delivered, as directed, to the United States Postal Service.

### 2.2 SALVAGED MATERIALS

- A. Removed and salvaged materials of value not designated for reinstallation, unless claimed as salvage by the United States Postal Service, shall become the property of the Contractor and shall be removed from the premises by the Contractor and recycled, reused or disposed of as specified in Section 013543- Environmental Procedures.
- B. The United States Postal Service will remove or, under separate contract, have all materials and equipment which the United States Postal Service requires removed prior to Work under this Section begins.

### 2.3 SALVAGED ITEMS FOR RE-USE

- A. Materials and items scheduled for re-use which are damaged by the contractor to the extent which they cannot be re-used shall be replaced by the Contractor at no additional cost to the United States Postal Service.
- B. Contractor shall remove and salvage the existing roof hatch and access ladder for re-use. Store on site in protected area for reinstallation as indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.

- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 PREPARATION

- A. Temporary Support: Provide adequate temporary support for work to be cut to prevent failure. Do not endanger other work.
- B. Provide adequate protection of other work during selective demolition to prevent damage and provide protection of the work from adverse weather exposure.

### 3.3 PROCEDURE

- A. Employ only skilled tradesmen to perform selective demolition.
- B. Cut work by methods least likely to damage work to be retained and work adjoining.
- C. In general, where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete and masonry work.
- D. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
- E. Where selective demolition terminates at a surface or finish to remain, completely remove all traces of material selectively demolished, including mortar beds. Provide smooth, even, substrate transition.

### 3.4 POLLUTION CONTROLS

- A. Use 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.
- B. Comply with governing authorities pertaining to environmental protection.
  - 1. Protect natural resources as specified in Section 013543 - Environmental Procedures.
- C. Clean adjacent portion of the structure and improvement of dust, dirt and debris caused by demolition operations, as directed by Contracting Officer and governing authorities. Return adjacent areas to conditions existing prior to the start of the work.

### 3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Collect, recycle, reuse, and dispose of demolished materials as specified in Section 013543 - Environmental Procedures and as approved by the U.S. Postal Service in the Solid Waste Management and Environmental Protection Plan.

END OF SECTION

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SELECTIVE STRUCTURE DEMOLITION

## SECTION 031000

### CONCRETE FORMING AND ACCESSORIES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes
  - 1. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
  - 2. Openings for other work.
  - 3. Form accessories.
  - 4. Form stripping.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 032000 - Concrete Reinforcement: Coordination between formwork and reinforcement.
  - 2. Section 033000 - Cast-in-Place Concrete: Supply of concrete accessories for placement by this section.

##### 1.2 REFERENCES

- A. American Concrete Institute (ACI) Codes and Standards latest editions:
  - 1. ACI 301 - Structural Concrete for Buildings.
  - 2. ACI 318 - Building Code Requirements for Reinforced Concrete.
  - 3. ACI 347 - Recommended Practice for Concrete Formwork.
- B. United States Department of Commerce Product Standard (PS):
  - 1. PS 1 - Construction and Industrial Plywood.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Provide data on void form materials and installation requirements. Submit data on form-coating materials.

##### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347.
- B. Where necessary, design formwork, shoring, and reshoring under direct supervision of a Professional Engineer experienced in design of formwork and licensed in State where Project is located.

##### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.

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- B. Deliver void forms and installation instructions in manufacturer's packaging.
- C. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Environmental Impact:
  - 1. Formwork: Reuse forms to greatest extent possible without damaging structural integrity of concrete and without damaging aesthetics of exposed concrete.

## PART 2 - PRODUCTS

### 2.1 WOOD FORMS

- A. Forms for Exposed Finish Concrete: Plywood panels, 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.
  - 1. 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. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Lumber: Construction grade; with grade stamp clearly visible.

### 2.2 PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage, well matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Void Forms (Carton Forms): Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set. Thickness indicated on drawings.
- C. Tubular Column Type: Metal or fiberglass-reinforced plastic. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.
- D. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration to match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.

### 2.3 ACCESSORIES

- A. Form Ties: Factory-fabricated, removable or snap-off type, metal, of fixed or adjustable length as applicable, with cone ends. Designed to prevent form deflection and to prevent spalling concrete upon removal. Back break dimension, 1-1/2 inch from exposed concrete surface. Provide ties that, when removed, will leave holes not larger than 1 inch diameter in concrete surface.
- B. Form Release Agent: 100 percent biodegradable colorless agent which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of subsequent coatings intended for use on concrete surfaces. Zero VOC.

1. Envirolux by Conspec, Kansas City, KS, (800) 348-7351 or (913) 287-1700.
  2. SMD-10 Soy Form Release by Strategic Market Development (800) 959-1071 or (815) 935-0863.
  3. Bio-Form by Leahy-Wolf, Franklin Park, IL, (888) 873-5327 or (847) 455-5710.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- C. Corners: Chamfered, wood strip 3/4 x 3/4-inch size; maximum possible lengths.
- D. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Nails, Spikes, Lag Bolts, Through Bolts, and Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- F. Waterstops (Rubber/PVC): Rubber or Polyvinyl chloride, minimum 1,750 tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, width as indicated on Drawings, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, and conditions are as required, and ready to receive Work.
1. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to United States Postal Service.

#### 3.2 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

#### 3.3 FORMWORK INSTALLATION

- A. Install formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 347R.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores upon approval by the Professional Engineer responsible for their design.

- D. Align joints and make watertight. Furnish in largest available sizes to minimize number of joints and to conform to joint system indicated on Drawings.
- E. Obtain approval from the Engineer or Architect before framing openings in structural members which are not indicated on Drawings.
- F. Provide chamfer strips on external corners of concrete members, to produce uniform, smooth lines and tight edge joints.
- G. Install void forms in accordance with manufacturer's published instructions. Protect forms from moisture or crushing.

#### 3.4 FORM RELEASE AGENT APPLICATION

- A. Apply form release agent on formwork in accordance with manufacturer's published instructions.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

#### 3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items which will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories in accordance with manufacturer's published instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- G. Install waterstops in accordance with manufacturer's published instructions continuous without displacing reinforcement. Seal joints watertight.

#### 3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.



- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

### 3.7 CONSTRUCTION

- A. Site Tolerances:
  - 1. Construct formwork to maintain tolerances required by ACI 301 and ACI 347.
  - 2. Camber slabs and beams 1/4 inch per 10 feet in accordance with ACI 301.

### 3.8 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspection and testing.
- B. Inspect erected formwork, shoring [, and reshoring], and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

### 3.9 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Do not remove shoring without approval from the Professional Engineer responsible for their design.
- C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- D. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION

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## SECTION 032000

### CONCRETE REINFORCEMENT

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Reinforcing steel bars.
  - 2. Steel wire mesh.
  - 3. Reinforcement accessories.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 316329 - Drilled Concrete Piers and Shafts: Reinforcement for drilled pier foundations.
  - 2. Section 031000 - Concrete Forming and Accessories: Coordination between formwork and reinforcing.
  - 3. Section 033000 - Cast-in-Place Concrete: Coordination between concrete placement and reinforcing.

##### 1.2 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. ACI 301 - Structural Concrete for Buildings.
  - 2. ACI 318 - Building Code Requirements for Reinforced Concrete.
  - 3. ACI SP-66 - American Concrete Institute - Detailing Manual.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM A 184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
  - 2. ASTM A 615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
  - 3. ASTM A 704 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
- C. American Welding Society (AWS):
  - 1. AWS D1.4 - Structural Welding Code for Reinforcing Steel.
- D. Concrete Reinforcing Steel Institute (CRSI):
  - 1. CRSI - Manual of Practice.
  - 2. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.
  - 3. CRSI 65 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

##### 1.3 SUBMITTALS

- A. Section 013300 – Submittal Procedures: Procedures for submittals.
  - 1. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel [and wire fabric, bending and cutting schedules, and supporting and spacing device. Include special reinforcement required for openings through concrete structures.
  - 2. Assurance/Control Submittals.
    - a. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- b. Submit certified copies of mill test report of reinforcement materials analysis.
- c. Welder's Certificates.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI 63, 65 and Manual of Practice ACI 301, ACI SP-66, ACI 318, and ASTM A 184.
- B. Design reinforcement under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State where the Project is located.
- C. Welders' Certificates: Submit certificate, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

### PART 2 - PRODUCTS

#### 2.1 STEEL REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615, 60 ksi yield grade; deformed billet steel bars, unfinished.
- B. Reinforcing Steel Mat: ASTM A 704, ASTM A 615, 60 ksi yield grade; steel bars or rods, unfinished.
- C. Reinforcing Steel Mesh: ASTM A1064; 6X6, w 2.9 X w 2.9.
- D. Dowels at Construction Joints: 1/4" x 4.5" Diamond Dowels by PNA Construction Technologies or approved equal.

#### 2.2 ACCESSORIES

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type (CRSI, Class 1) or stainless steel protected (CRSI, Class 2); size and shape as required.

#### 2.3 FABRICATION

- A. Fabricate concrete reinforcing in accordance with ACI SP-66 and ACI 318.
- B. Weld reinforcement in accordance with AWS D1.4.
- C. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Review location of splices with Contracting Officer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to United States Postal Service.

### 3.2 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing in accordance with ACI 318.

### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspection.
- B. Inspect reinforcing locations, bar types and sizes, wire ties, and welding (if applicable).

END OF SECTION

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## SECTION 033000

### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Includes all labor, materials and appliances, and perform all operations in connection with the installation of Concrete Work, and all related work incidental to the completion thereof, as shown on the drawings, complete, in strict accordance with the drawings and as specified herein. Section Includes:
1. Cast-in-place (CIP) concrete in building frame elements, walls, foundations, foundation walls, slabs-on-grade, and mechanical equipment pads.
  2. Finishing of concrete floor slabs and toppings. Concrete liquid surface treatment, sealer, and slip-resistant coatings.
  3. Expansion and contraction, control joints in CIP concrete.
  4. Concrete curing and protection.
  5. Non-shrink grout including installation and forming.
  6. Testing related services.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents and References in Section 1.2.
- C. Related Sections: Related work specified elsewhere includes but may not be limited to
1. Section 031000: Concrete Forming and Accessories
  2. Section 032000: Concrete Reinforcement

##### 1.2 REFERENCES

- A. American Concrete Institute (ACI) Codes and Standards latest editions:
1. ACI 117, "Standard Specification for Tolerances for Concrete Construction and Materials."
  2. ACI 301, "Specification for Structure /Concrete."
  3. ACI 302.1R, "Guide for Concrete Floor and Slab Construction."
  4. ACI 304R, "Guide for Measuring, Mixing, Transporting, and Placing Concrete."
  5. ACI 305, "Hot Weather Concreting."
  6. ACI 306, "Cold Weather Concreting."
  7. ACI 311, "Recommended Practice for Concrete Inspection."
  8. ACI 315, "Details and Detailing of Concrete Reinforcement."
  9. ACI 318, "Building Code Requirements for Structural Concrete."
  10. ACI 347, "Guide to Formwork for Concrete."
- B. American Welding Society (AWS)
1. AWS D1.4, "Structural Welding Code Reinforcing."
- C. American Society for Testing and Materials (ASTM).
1. ASTM A615, "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement."
  2. ASTM C33, "Standard Specification for Concrete Aggregates."
  3. ASTM C94, "Standard Specification for Ready-Mixed Concrete."
  4. ASTM C150, "Standard Specification for Portland Cement."

5. ASTM C260, "Standard Specification for Air Entraining Admixtures for Concrete."
  6. ASTM C309, "Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete."
  7. ASTM C494, "Standard Specification for Chemical Admixtures for Concrete."
  8. ASTM C618, "Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete."
  9. ASTM C989, "Standard Specification for Ground Granulated Blast-Furnace Slag for Use in
- D. Concrete Reinforcing Steel Institute (CRSI),
1. CRSI "Manual of Standard Practice."

### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
1. Product Data: Provide data technical, testing, and source for mix design materials and additives, steel reinforcement, joint sealant, and other products as specified on the drawings.
  2. Shop Drawings: Provide shop drawings for reinforcement, layout, detailing, and placing prior to fabrication, site delivery, and installation.
    - a. Mix design submittals.
    - b. Rebar placing drawings (ACI 315, "Detailing Manual SP-66-(04)" or CRSI "Manual of Standard Practice MSP-2-81"): Show bar sizes, bending, placing, spacing, locations, and quantities of reinforcing and wire fabric and supporting and spacing accessories. Provide steel order lists including bending and cutting details for all reinforcement shown on the structural design drawings.
    - c. Form construction details, including jointing, special formed joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
    - d. Calculations and layout drawings for formwork, shoring and/or reshoring, and other submittals indicated on the drawings. Work shall be prepared and signed and sealed by a Professional Engineer.
  3. Assurance/Control Submittals:
    - a. Test Reports: Prepare reports in conformance with Section 014000 - Quality Requirements
    - b. Submit laboratory test reports for concrete materials and mix designs for each strength and type of concrete proposed for use.
    - c. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
  4. Delivery Tickets:
    - a. Copies of delivery tickets for each load of concrete delivered to site.
    - b. Indicate on each ticket the exact time that the mix is batched.
    - c. Mix identification number on ticket shall match number on submitted and approved mix design
    - d. Submit copies to Testing Laboratory for verification of compliance with placing time.

### 1.4 QUALITY ASSURANCE

- A. Perform work in accordance with the Codes and Standards referenced in section 1.2 of this specification.
1. Provide qualification data for manufacturers and installers.
- B. Pre-Installation Conference:
1. Conduct a pre-installation conference prior to commencing Work of this Section.
- C. Crack Prevention:
1. Submit quality control plan that incorporates provisions for concrete crack prevention at least 60 days prior to any slab on grade placement. The quality control plan shall be reviewed in the pre-installation

conference. If wire mesh is used, the construction manager shall employ a full-time 3<sup>rd</sup> party inspector to monitor this element during all concrete placement operations to ensure that mesh is maintained in the proper position. This inspection is in addition to the other concrete material testing.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Deliver materials in unopened containers with labels identifying contents.
- C. Store powdered materials in dry area and in manner to prevent damage. Protect liquid materials from freezing or exceeding maximum storage temperatures set by product manufacturer.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. *Resource Management:*
  - 1. *Recycled Content:*
    - a. *Concrete: Fly ash may be used as a substitute for a maximum of 20 percent of Portland cement unless otherwise specified by the engineer.*
    - b. *Concrete: Ground granulated blast furnace slag (GCBFS) may be used as a substitute for a maximum of 20 percent of Portland cement.*

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Applied Concrete Technology, Inc., Post Office Box 548, Grayslake, IL 60030, Toll Free: 800-228-6694, Phone: 847-548-2444, Fax: 847-548-2555. [www.protecrete.com](http://www.protecrete.com)
  - 2. The Euclid Chemical Company, 19218 Redwood Road, Cleveland, OH 44110, Phone: 216-1-9222, Toll Free: (800) 321-7628, Fax: 216-531-9596 [www.euclidchemical.com](http://www.euclidchemical.com).
  - 3. Fortifiber Corporation, 419 W. Plumb Lane, Reno, NV 89509, Toll Free: 800-773-4777, Fax: 775-333-6411, Website: [www.fortifiber.com](http://www.fortifiber.com).
  - 4. ChemRex Inc., Shakopee, Minnesota 55379, Toll Free: 800-433-9517, Fax: 800-496-6067.
  - 5. BASF Construction Chemicals North America (former Master Builders), 23700 Chagrin Boulevard, Cleveland, OH 44122, Phone: 216-839-7500, Fax: 216-839-8821.
  - 6. W.R. Meadows, Inc., PO Box 338, Hampshire, Illinois 60140-0338, Toll Free: 800-342-5976, Phone: 847-683-4500.
  - 7. Reef Industries, 9209 Almeda Genoa, Houston, Texas 77075, Phone: 713-507-4251, Toll Free: 800-231-6074, Fax: 713-507-4295.
  - 8. Stego Industries LLC, 27442 Calle Arroyo Suite A, San Juan, Capistrano, CA 92675, Phone: 877-464-7834, Fax: 949-493-5165, [www.stegoindustries.com](http://www.stegoindustries.com).
  - 9. L & M Construction Chemicals, Inc. 14851 Calhoun Rd., Omaha, NE 68152-1140; Phone: 402-453-6600, Fax: 402-453-0244.
  - 10. Curecrete Chemical Company, Inc., 1203 W. Spring Creek Pl., Springville, UT Phone: 801- 489-5663.
  - 11. Midwest Floor Care Inc., 17202 Princeton Rd, Adams, NE 68301, Phone: 402-788-2820.
  - 12. General Resource Technology, Inc., 2978 Center Court, Eagan, MN 55121, Phone: 800-324-8154, Fax: 651-454-4252, [www.grtinc.com](http://www.grtinc.com).

- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

## 2.2 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150 – Type I or III supplement with fly ash ground granulated blast-furnace slag.
- B. Liquid admixtures: The following admixtures are permitted when approved in writing prior to use or are required as specified herein and shall be used in strict accordance with the manufacturer's specifications or recommendations:
  - 1. Calcium chloride: Conform to ACI 301. The water-soluble chloride ion level shall not exceed 0.1 percent by weight of cement.
  - 2. Air-entraining admixtures: ASTM C260 for steel hard trowel interior slab finish, do not use air entrainment admixtures.
  - 3. Water-reducing admixtures: Conform to ASTM C494, Type A.
  - 4. Water-reducing/accelerating admixtures: Conform to ASTM C494, Type C or E.
  - 5. Water-reducing/retarding admixtures: Conform to ASTM C494, Type D.
    - a. High-range/water-reducing (HRWR) admixtures: Conform to ASTM C494, Type F or G super plasticizers. HRWR admixture shall be used in concrete with a maximum water/ cement ratio of 0.50 or less.
- C. *Fly ash: Conform to ASTM C618. The use of a quality fly ash will be permitted as a cement-reducing admixture (minimum 15 percent and maximum 20 percent) unless otherwise restricted by the engineer. Fly ash used in concrete shall be from a single source and of a single class in combination with Portland cement of a single source and single class unless otherwise approved by the Engineer.*
- D. *Granulated Blast Furnace Slag is an alternative to fly ash and shall conform to ASTM C989 Grade 100 Or 120. Granulated blast furnace slag may be used as a substitute for a maximum of 20 percent of Portland cement.*
- E. Aggregates:
  - 1. Normal-weight concrete - ASTM C33.
  - 2. Light-weight concrete – ASTM C330.
  - 3. Aggregates shall be from a single source.
- F. Water:
  - 1. Clean, potable, and free of injurious amounts of oil, acid, alkali, organic or other deleterious matter not detrimental to concrete; drinkable.

## 2.3 GROUT/MORTARS

- A. Cement grout: Conform to ASTM C387 "Dry packaged mixtures".  
*Exposed slabs shall be sealed in a fashion compatible with the curing method specified.*

## 2.4 CURING/SEALING/HARDENERS

- A. Dissipating liquid membrane-forming compounds for curing concrete; Conform to ASTM C309, Type 1. Curing compound shall be compatible with floor sealer or finish used. Low VOC.
- B. Method of curing shall be approved by the finish flooring applicator where finishes are indicated.



- C. Exterior Sealers: applied to horizontal concrete surfaces permanently exposed to salts, deicer chemicals and moisture, including parking decks. The manufacturer shall provide a five-year labor and materials warranty on performance of the sealer. Sealer shall be compatible with the curing compound used.
- D. Liquid Densifier/Sealer/Hardener: to be applied on exposed concrete floors cured with dissipating membrane forming curing compound to harden and densify concrete surfaces. Sealers are to be clear, chemically reactive, a waterborne solution of silicate or silicate materials and proprietary components, odorless, and colorless.

## 2.5 JOINTS AND EMBEDDED ITEMS:

- A. Construction and Contraction Joints: Sealant shall be two-part semi-rigid epoxy and shall have minimum Shore A Hardness of 80 when measured with ASTM D2240.
- B. Isolation Joints: Fillers shall consist of 1/8-inch width strips of neoprene, synthetic rubber, or approved substitute, extending the full depth of the slab. Sealant shall be two-part elastomeric type, polyurethane base.

## 2.6 VAPOR BARRIER/RETARDER

- A. Provide cover over prepared soil, **above** aggregate subbase material at slabs-on-grade, where shown on the plans with a minimum thickness of 10 mils. Use only materials which are resistant to decay.

## 2.7 PROPORTIONING

- B. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If laboratory trial batch method is used, use an independent testing facility acceptable to Contracting Officer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing and inspection unless otherwise acceptable to Contracting Officer.
- C. Submit written reports to the testing laboratory of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been reviewed and approved.
- D. Concrete types and strengths: Minimum 28 Day Compressive Strength shall be per design requirements but not less than:
  - 1. Paving base, columns, beams, walls, foundations, and footings: 4,000 psi.
  - 2. Slab-on-grade: 4,000 psi.
  - 3. Normal or Lightweight concrete on metal deck: 4,000 psi.
  - 4. Tilt-up: 4,000 psi.
  - 5. All concrete exposed to weather shall be air entrained (ASTM C260).
  - 6. All concrete shall be normal weight except as noted above.
- E. Durability: Conform to ACI 301.
  - 1. All concrete exposed to potentially destructive weathering, such as freezing and thawing, or to deicer chemicals is to be air-entrained, 6 ± 1 percent.
  - 2. Water-cement ratio: For concrete subject to freezing and thawing or deicer chemicals, the water-cement ratio shall not exceed 0.53 by weight including any water added.
- F. Slump: Conform to ACI 301 and to specific project mix requirements.

- G. Production of concrete: Conform to ACI 301:
1. Cast-in-place concrete used in the work shall be produced at a single off-site batching plant or may be produced at an on-site batch plant.
  2. All concrete shall be proportioned conforming to the approved mix designs and of the materials contained in those approved mixes.
  3. Prior to adding a high-range water reducer (super plasticizer), slump shall not exceed the working limit.
  4. Ready-mixed and on-site batched concrete shall be batched, mixed, and transported in accordance with ASTM C94.
    - a. The concrete producer shall furnish duplicate delivery tickets, one for the Contractor and one given to the Owner's Representative for each batch of concrete. The information provided on the delivery ticket shall include the quantity of materials batched including the amount of free water in the aggregate and any water added onsite. Show the date, time of day batched, and if ready-mixed the time of discharge from the truck. The quantity of water that can be added at the site without exceeding the maximum water-cementitious ratio specified shall be noted on the delivery ticket.
  5. For concrete produced on site with a central batch plant, mixing shall be done in an approved batch mixer concrete shall be batched, mixed, and transported in accordance with ASTM C94.
  6. Variations in consistency during the discharge of a single batch shall not exceed 1 inch of slump, except that a greater variation will be permitted if the slump of the concrete decreases and no water is added.
  7. All other concrete: Conform to ACI 301
  8. When improved workability, pumpability, lower water-cement ratio, or high ultimate and/or early strength is required, the HRWR admixture (super plasticizer) may be used.
  9. Ensure air content for slabs with steel trowel finish is less than 3.0 percent.
  10. No water shall be added to concrete except under the direct awareness of the project inspector.
  11. Adjustments to concrete mixes: Mix design adjustments may be requested by Contractor for approval by the Engineer at no additional cost to Contracting Officer. Laboratory test data for revised mix design and strength results must be submitted and accepted before using in work.

## 2.8 FORMWORK

- A. Section 031000: Concrete Forming and Accessories

## 2.9 REINFORCING MATERIALS

- A. Section 032000: Concrete Reinforcement

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION - GENERAL

- A. Install all cast-in-place concrete work in accordance with ACI 301 except as herein specified.
- B. All bearing materials shall be inspected by the Geotechnical Engineer prior to placing concrete. The Geotechnical Engineer specify site preparation requirements and provide recommendations to the Architect/Engineer prior to placing concrete.
- C. Immediately before placing concrete, spaces to be occupied by concrete shall be free from standing water, ice, mud, and debris.
- D. Concrete shall not be deposited under water or where water in motion may injure the surface finish of the concrete.
- E. Forms and the reinforcement shall be thoroughly cleaned of ice and other coatings. Remove surplus form releasing agent from the contact face of forms.
- F. Notify all trades concerned and the Owner's Representative sufficiently in advance of the scheduled time for concrete placement to permit installation of all required work by other trades.
- G. Before placing concrete, all required embedded items, including dovetail anchor slots, anchors, inserts, curb angles, metal frames, fixtures, sleeves, drains, stair nosings, accessory devices for Mechanical and Electrical installations shall be properly located, accurately positioned and built into the construction, and maintained securely in place.
- H. Build into construction all items furnished by the Owner and other trades. Provide all offsets, pockets, slabs, chases and recesses as job conditions require.
- I. Place and properly support reinforcing steel and anchor bolts.
- J. The alignment, orientation, spacing, and embedment length of mechanical load transfer devices in slab-on-grade and pavements shall conform to dimensions and tolerances shown on the drawings.

### 3.3 INSTALLATION - FORMWORK

- A. Section 031000 Concrete Forming and Accessories
- B. Construction and Contraction Joints: Conform to ACI 301 and recommendations of ACI 302.1R.

### 3.4 REINFORCEMENT

- A. Placement: Section 032000 Concrete Reinforcement

### 3.5 METHODS OF PLACEMENT AND PLACING CONCRETE

- A. Placement: Conform to ACI 301:
  - 1. Concrete shall be placed within 90 minutes after the water has been added to the cement and aggregates. Concrete shall be placed prior to initial concrete set.

2. Placing of concrete will not be permitted during rainfall or when rain appears imminent. If rain should fall subsequent to placement, the concrete shall be completely protected until curing is complete.
3. Cold-Weather Placement: Comply with provisions of ACI 306.1 "Standard Specifications for Cold-Weather Concreting" for placement at temperatures below 40 deg F (4 deg C).
  - a. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
  - b. Concrete shall not be placed on frozen ground or placed when the ambient temperature is 40 deg F or less and dropping.
  - c. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures using vented heaters and insulating blankets.
  - d. Concrete temperatures shall be maintained above 50 degrees F for the first 7 days of curing.
4. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305R "Standard Specification for Hot-Weather Concreting" for placement at temperatures above 90 deg F (32 deg C).
  - a. Reject any concrete that has a temperature at the point of placement above 90 deg F unless approved otherwise by the Engineer. When air temperatures are between 80 and 90 deg F the maximum mixing and delivery time is reduced to 75 minutes. When air temperatures exceed 90 deg F, the maximum mixing and delivery time is reduced to 60 minutes.
  - b. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to the Engineer.

B. Depositing Concrete

1. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing.
2. The number, type, position, and design of joints shall be approved by the Engineer prior to concrete placement.
3. Place floor slabs-on-grade in alternating strips, waiting a minimum of 3 days before placing any slab adjacent to previously placed slab.
4. The concreting shall be carried on at such a rate that the concrete is always plastic and flows readily into the spaces between reinforcing bars. No concrete that has partially hardened or been contaminated by foreign materials shall be deposited in the work
5. When concreting is started, it shall be carried on as a continuous operation until the placing of the section is completed.
6. Except as intercepted by joints, concrete shall be placed in continuous layers.
7. Field records shall be kept of the time and date of the placing of each concrete pour. Locations where concrete test cylinders are made shall also be recorded. Records shall be kept on file at the job until its completion and shall be always subject to the inspection of the Owner's Representative.

C. Joints

1. Joints shall be vertical in walls and horizontal in slabs unless otherwise specified on the drawings.
2. Dowel bars and tie bars shall be inspected
3. Control joints for controlling concrete shrinkage shall be provided in floor slabs, walls, decks, conduits, and channels as shown on the plans or approved by the Engineer.
4. Joint spacing and sawcut depth for slab-on-grade and concrete pavement shall conform to that shown on the pour sequencing plan and/or drawings.
  - a. Sawed control (contraction) joints for pavements and slab-on-grade shall be installed as soon as practical so as not to ravel the concrete but less than 12 hours.
  - b. Joint spacing shall not exceed 15 feet on center each way unless otherwise approved by the Engineer.
5. Joints in slabs shall align with column lines and joints in adjoining walls unless otherwise approved by the Architect/Engineer or shown in the drawings. Joints shall also line up with architectural reveals and form lines. All corners shall be relieved by cutting joint to adjacent control joint.
6. If there is a delay in casting but prior to concrete initial set, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of that previously placed to avoid cold joints.
7. Where placing concrete is interrupted long enough for the concrete to take its initial set, the working face shall be made a construction joint.
  - a. Preparation and disposition of unplanned cold joints in walls shall be approved by the Engineer.

- b. For slab-on-grade, pavements, sidewalk, and curb and gutter, concrete shall be removed back to the nearest planned joint and a construction joint installed.
  - 8. Unless otherwise noted on the drawings, where concrete is to be placed against existing concrete, except in the case of expansion joints, the joint face of the existing concrete shall be roughened.
  - 9. Corner sections of walls shall not be placed until the adjoining wall sections have cured at least 14 days.
- D. Consolidation
  - 1. All concrete shall be thoroughly consolidated by internal mechanical vibrators during the placing operation and shall be thoroughly worked around the reinforcement and embedded fixtures and into corners of the forms.
  - 2. Consolidation shall be carried on continuously with the placing of concrete.
  - 3. Slabs shall be placed using vibrating screed.
  - 4. The vibrator shall be kept in nearly a vertical position as practical. The use of vibrators to shift or drag concrete after deposition will not be permitted. Vibrators shall not be laid horizontally or laid over.
  - 5. Concrete shall not be placed until the previous layer has been vibrated.
  - 6. Unless directed otherwise by the Engineer, the top 2 feet of walls shall be re-vibrated approximately 1 hour after placement of concrete and while a running vibrator will still sink under its own weight into the concrete and liquefy it momentarily.
- E. Protection of cast concrete: Conform to ACI 301.
- F. Repair of surface defects: Conform to ACI 301.

### 3.6 FINISHING

- A. Finishing of formed surfaces: ACI 301:
  - 1. Tops of forms:
    - a. Strike concrete smooth at tops of forms.
    - b. Float to texture comparable to formed surfaces.
  - 2. Formed surfaces:
    - a. Finished formed surfaces shall conform accurately to the shape, alignment, grades, and sections shown on the drawings or prescribed by the Engineer.
    - b. Surfaces shall be free from fins, bulges, ridges, honeycombing, or roughness of any kind and shall present a finished, smooth, continuous hard surface.
    - c. Rough form finish at unfinished areas unexposed to public view. Smooth form finish at surfaces exposed to public view.
- B. Slabs: Minimum slab surface tolerance must satisfy ACI 301 and ACI 302.1R.
  - 1. Slabs-on-grade:
    - a. For exposed slabs, install semi-rigid epoxy sealant in construction and contraction joints after slab has a minimum of 60 days or otherwise approved by the Engineer.
    - b. Allowable tolerance for slab on grade surfaces, measured in accordance with ACI 117 shall meet or exceed an overall value of FF35/FL25, with minimum local value of FF24/FL17.
  - 2. Suspended Floor Slab:
    - a. Minimum surface tolerances: FF25 & FL20 overall and FF20 & FL15 local.
  - 3. Concrete Finishes:
    - a. Floor Slabs: Steel trowel finish unless otherwise noted on the plans.
    - b. Exposed concrete slabs sealed or sealed and hardened using a liquid compound compatible with the curing method used.
    - c. Exterior Concrete Finishes: Unless otherwise noted on the drawings, floors, walkways, and roof finishes shall be sloped a minimum 0.125 inch per foot to drain water. A light steel trowel with broom finish unless otherwise noted on the plans. Apply exterior sealer to surfaces exposed to deicer chemicals that is compatible with the curing method used.

- d. Exposed Ramps, Landings and Stair Treads: A light steel trowel with broom finish unless otherwise noted on the plans. Surfaces shall be sealed or sealed and hardened using a liquid compound compatible with the curing method used.
- e. A heavy broom finish shall be provided on disabled person ramps, utility ramps, and around exterior loading docks.

### 3.7 CURING, PROTECTION, LIQUID HARDNERS AND SEALERS

#### A. Temperature, Wind, and Humidity

- 1. When concrete slabs and other unformed concrete is placed in warm, dry, dusty, or windy conditions, concrete surfaces shall be protected from rapid drying by use of windbreaks, shading, fogging with properly designed nozzles, or a combination of these measures. Hot weather concreting procedures provided in ACI 305R shall be used when ambient conditions dictate.
- 2. Cold weather concreting procedures provided in ACI 306R shall be used when ambient conditions dictate.

#### B. Curing Compound

- 1. Apply curing compound to all interior and exterior flat slab and vertical surfaces. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
- 2. All curing methods shall be placed [within two hours] after final finishing. All exposed surfaces of concrete including floor slabs, whether or not they receive a finish flooring, shall be protected from premature drying for a minimum of seven days.
- 3. Apply the specified curing compound in accordance with manufacturer's written instructions.
- 4. When used on an unformed concrete surface, application of the first coat of curing compound shall commence immediately after finishing operations have been completed. When curing compound is used on a formed concrete surface, the surface shall first be moistened with a fine spray of water immediately after the forms have been removed.
  - a. Surfaces shall be sprayed uniformly with 2 coats of curing compound. As soon as the first coat has become dry, a second coat shall be applied in the same manner. The direction of application of the second coat shall be perpendicular to the first coat.

#### C. Hardener

- 1. Apply liquid densifier/sealer/hardener to all workroom, interior and exterior mail platform, and dock, BMEU, and similar floor surfaces.
- 2. Apply in accordance with manufacturer instructions.

#### D. Exterior Sealer

- 1. Apply to all exterior horizontal traffic and pedestrian surfaces that are exposed to salts, deicer chemicals, and moisture, including parking decks.
- 2. Apply in accordance with manufacturer's instructions.

#### E. Protection

- 1. Freshly placed concrete shall be protected against wash by rain.
- 2. Dust control shall be provided in the surrounding areas during placement.
- 3. During the first 2-day period of curing, no traffic on or loading of the floors will be permitted unless otherwise approved by the Engineer.
- 4. The contractor shall allow no traffic and take precautions to avoid damage to the membrane of the curing compound for a period of not less than 28 days. Damage shall be repaired immediately.
- 5. Self-supporting structures shall not be loaded in such a way to overstress the concrete.

- F. All floor slabs shall be cured using products and methods compatible with selected floor adhesives, toppings, and other finish materials.

### 3.8 PATCHING AND REPAIR

- A. All repairs of defective areas shall conform to ACI 301. On areas requiring treatment of defects and until such repairs have been completed, only water cure will be permitted
- B. At any time prior to final acceptance, concrete found to be defective, damaged, or not in accordance with the specifications shall be repaired or removed and replaced with acceptable concrete.
- C. Repair or replace concrete with excessive honeycombing due to improper placement.
  - 1. If approved, a bonding admixture, bonding compound, or epoxy adhesive may be used in accordance with the manufacturer's preparation and application recommendations. Comply with ACI 301 and ACI 503.2 for standard specifications for bonding plastic concrete to hardened concrete with a multiple component epoxy adhesive.
  - 2. The repair concrete shall be thoroughly consolidated in place and struck off so as to leave the patch slightly higher than the surrounding surface. The concrete shall be left undisturbed for at least 1 hour to permit initial shrinkage then finished.
  - 3. The patched area shall be kept damp for 7 days.
  - 4. The color of the patch material shall match the color of the surrounding concrete. Repairs shall be made promptly while the base concrete is less than 28 days old
- D. Areas showing excessive defects as determined by the Architect/Engineer shall be removed and replaced.
- E. High spots identified in the floor flatness and levelness survey may be removed with bump grinding. Areas to be ground shall not exceed more than 10 percent of any one slab nor more than 5 percent of the total slab-on-grade area.
- F. Random hairline cracks in up to 3% of the slab panels will be accepted. Cracks in these panels shall be routed and filled with semi-rigid joint filler. If more than 3% of panels contain cracks, the number of panels exceeding the 3% limit shall be demolished and replaced at the direction of the Contracting Officer, crack repairs will not be accepted. Any panels that contain cracks wider than 0.022" shall be demolished and replaced.
- G. Interior slab-on-grade hairline cracks allowed to be repaired that are subjected to powered industrial truck traffic shall be routed and sealed with a semi-rigid epoxy sealant. Exterior slabs may be routed and sealed with the flexible joint sealant to be installed in pavement joints.

### 3.9 GROUTING

- A. After steel columns have been installed and leveled, grout the space between the bottom of the plate and concrete, using cement grout completely filling the space and forming solid bearing for the column base plate.

### 3.10 EVALUATION AND ACCEPTANCE OF CONCRETE

- A. Comply with ACI 301, ACI 318-Chapter 5 and ACI 311 for compressive strength, slump, and frequency of testing.
- B. The frequency of testing indicated in the aforementioned codes and standards shall be increased if concrete fails to meet the acceptance criteria or if deemed by the Engineer to be too variable.

### 3.11 ACCEPTANCE OF STRUCTURE

- A. Comply with ACI 301 and modifications in this section.
- B. Completed concrete work, which meets all applicable requirements, will be accepted without qualification.

- C. Completed concrete work which fails to meet one or more requirements, but which has been repaired to bring it into compliance will be accepted without qualification.
- D. Completed concrete work which fails to meet one or more requirements, and which cannot be brought into compliance may be accepted or rejected by the Contracting officer. In this event, modifications may be required to assure that remaining work complies with the requirements.
- E. The costs of any additional tests or analysis, including additional architectural and engineering services, performed to prove the adequacy of the concrete work, shall be borne by the Contractor without extension of contract time.

### 3.12 MISCELLANEOUS CONCRETE

- A. Curbs: Provide monolithic finish to interior surface of 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.
- B. Equipment bases and foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment with template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

### 3.13 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Requirements:
  - 1. Provide and maintain an adequate program of quality control for the materials, production methods, and workmanship to assure conformance of all work to the project contract documents.
  - 2. Testing and Evaluation:
    - a. Furnish and pay for the services of an independent Testing Laboratory satisfactory to the Contracting Officer. The testing laboratory shall have prime responsibility for review, verification inspection, and testing of the concrete producer's materials, operations, facilities, and quality control procedures and evaluating the results for conformance with these specifications.
    - b. In addition to the requirements and duties in ACI 301 the testing laboratory shall provide the following:
      - a. One or more additional test cylinders shall be taken during cold weather concrete placement and cured on the job site under conditions of concrete represented to determine safe form-stripping period.
      - b. Inspect concrete batching, mixing, and delivery operations periodically or as directed by the Contracting Officer.
      - c. Submit to the Contracting Officer and concrete producer, during construction, the results of concrete tests.
    - c. The Testing Laboratory shall assess and report floor flatness and levelness in accordance with the requirements of this specification.
    - d. Field and concrete plant inspections are to be made by a competent representative of the Testing Laboratory during all structural concreting operations including periodic audit and spot check of the Producer's and/or Contractor's quality control procedures to assure proper and adequate control. When it appears that any material furnished fails to fulfill specification requirements, the Testing Laboratory is to report such deficiency immediately to the Contracting Officer and appropriately record it in his report.

END OF SECTION



033000 - 13

USPS MPF SPECIFICATION

Date: 00/00/0000

CAST-IN -PLACE CONCRETE

## SECTION 040514

### MASONRY MORTARING AND GROUTING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Mortar and for unit masonry.
  - 2. Grout for unit masonry.
- B. Related Sections:
  - 1. Section 042200 - Concrete Unit Masonry: Installation of mortar and grout, reinforcement, and anchorages.

##### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C 94 - Specification for Ready-Mixed Concrete.
  - 2. ASTM C 143 - Test Method for Slump of Hydraulic Cement Concrete.
  - 3. ASTM C 144 - Specification for Aggregate for Masonry Mortar.
  - 4. ASTM C 150 - Specification for Portland Cement.
  - 5. ASTM C 207 - Specification for Hydrated Lime for Masonry Purposes.
  - 6. ASTM C 270 - Specification for Mortar for Unit Masonry.
  - 7. ASTM C 387 - Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
  - 8. ASTM C 404 - Specification for Aggregates for Masonry Grout.
  - 9. ASTM C 476 - Specification for Grout for Masonry.
  - 10. ASTM C 1019 - Method of Sampling and Testing Grout.
  - 11. ASTM C 1142 - Specification for Extended Life Mortar for Unit Masonry.
- B. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Samples: Submit two samples 3-inch x 3 inch in size illustrating mortar color and color range.
  - 2. Assurance/Control Submittals:
    - a. Design Data: Design mix in accordance with the Proportion specification of ASTM C 270 and required environmental conditions.
    - b. Test Reports: Submit the following reports directly to Contracting Officer from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.
      - 1) Conformance to Proportion specification of ASTM C 270.
      - 2) Test and evaluation reports to ASTM C 780.
    - c. Certificates: Submit manufacturer's certificate that Products meet or exceed specified requirements.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Store sand for mortar on plastic sheeting to prevent contamination by extraneous chemicals in earth beneath.

#### 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
  - 1. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
  - 2. Specific Cold Weather Requirements: When the ambient air temperature is below 40 degrees F, heat mixing water to maintain mortar temperature between 40 degrees F and 120 degrees F until placed. When the ambient air temperature is below 32 degrees F, heat the sand and water to maintain this mortar temperature.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Portland Cement: ASTM C 150, normal-Type I or Type II; gray color. Fly ash, slag, and pozzolans not permitted as substitutes for Portland cement.
- B. Mortar Aggregate: ASTM C 144, standard masonry type; clean, dry, protected against dampness, freezing, and foreign matter.
- C. Grout Aggregate: ASTM C 404; use of blast furnace slag is not permitted. Maximum coarse aggregate size, 3/8 inch.
- D. Calcium chloride is not permitted in mortar or grout. Admixtures or other chemicals containing Thyocyanates, Calcium Chloride or more than 0.1 percent chloride ions are not permitted.
- E. Hydrated Lime: ASTM C 207, Type S.
- F. Water: Potable.
- G. Admixtures: Not permitted unless approved by Contracting Officer prior to construction.

#### 2.2 MIXES - MORTAR

- A. Mortar: Type "N" or Type "S", as recommended by manufacturer, in accordance with the Proportion specification of ASTM C 270.
  - 1. Mixing of components on-site is acceptable.
  - 2. Mixing on-site water and packaged dry blended mix for mortar (ASTM C 387), that contains no masonry cement, is acceptable.

- B. Pointing Mortar: Duplicate original mortar proportions. Add aluminum tristearate, calcium stearate, or ammonium stearate equal to 2 Percent of Portland cement weight.
- C. Mortar Color: **Match Existing.**

### 2.3 MIXING - MORTAR

- A. Thoroughly mix mortar ingredients in accordance with ASTM C 270, in quantities needed for immediate use.
  - 1. Maintain sand uniformly damp immediately before the mixing process.
  - 2. Provide uniformity of mix and coloration.
  - 3. Do not use anti-freeze compounds.
  - 4. If water is lost by evaporation, retemper only within 2 hours of mixing. Do not retemper mortar more than 2 hours after mixing.

### 2.4 MIXES - GROUT FILL

- A. Grout fill is for concrete masonry unit bond beams, lintels, and reinforced cells with reinforcing bars and embedded plates.
  - 1. Compressive Strength: 2000 psi minimum at 28 days, as determined in accordance with the provisions of ASTM C 1019.
  - 2. Slump: 8 inches, minimum; 10 inches, maximum, taken in accordance with ASTM C 143.
  - 3. Use coarse grout when grout space is equal to or greater than 4 inches in both directions.
  - 4. Use fine grout when grout space is smaller than 4 inches in either direction.
  - 5. Do not use air-entrainment admixtures.

### 2.5 MIXING - GROUT

- A. Grout: Batch and mix grout in accordance with ASTM C 94 or ASTM C476 for site batched and mixed grout. Do not use anti-freeze compounds to lower the freezing point of grout.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION

- A. After reinforcing of masonry is securely tied in place, plug cleanout holes with masonry units. Brace against wet grout pressure.
- B. Install mortar and grout under provisions of Section 042200

### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Procedures for testing.
- B. Testing - Masonry Grout: Conduct strength tests in accordance with ASTM C 1019.
  - 1. Take two strength samples for each 5000 square feet of masonry wall surface for each type of grout placed each day.
  - 2. Create test samples by forming with wood surface on bottom and concrete block on sides. The samples shall be 3 inches square and 6 inches high.
  - 3. Initial cure during first 48 hours. Protect samples from loss of moisture by covering with wet cloth and keeping moist. Protect from freezing and variations in temperature. Record maximum and minimum temperatures by using a max/min thermometer.
  - 4. Remove masonry units that form samples after 48 hours and transport grout samples to laboratory. Keep samples protected from vibration, freezing, and moisture loss during transportation.
  - 5. Test samples with test method ASTM C 39 at 28 days. Compressive strength shall be the average of the two samples and shall be adequate if it equals the designated compression strength as defined on the Drawings, but not less than 2000 psi.
- C. Testing - Masonry Mortar: Conduct strength tests in accordance with the following:
  - 1. Spread mortar on the masonry units 1/2 inch to 5/8 inch thick and allow to stand for one minute.
  - 2. Remove mortar and place in a 2-inch by 4-inch cylinder in two layers, compressing the mortar into the cylinder using a flat-end stick or fingers. Lightly tap mold on opposite sides, level off and immediately cover molds and keep them damp until taken to the laboratory.
  - 3. After 48 hours' set, have the laboratory remove molds and place them in the fog room until tested in damp condition.

END OF SECTION

USPS MPF Specification

SECTION 042200  
CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Concrete unit masonry veneer.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections:
  - 1. Section 040514 - Masonry Mortaring and Grouting: Mortar and grout.

1.2 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. ACI 530 - Building Code Requirements for Masonry Structures.
  - 2. ACI 530.1 - Specifications for Masonry Structures.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM A 615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - 2. ASTM C 55 - Specification for Concrete Brick.
  - 3. ASTM C 129 - Specification for Non-Load Bearing Concrete Masonry Units
- C. International Masonry Industry All- Weather Council (IMIAC): Recommended Practices and Guide Specifications for Cold Weather Masonry construction.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Data for each masonry unit type, accessory, and other manufactured products indicated.
  - 2. Shop Drawings: Precast inserts and keys showing sizes, profiles, and locations of each precast unit required.
  - 3. Samples: Two samples of each masonry unit type to illustrate color, texture, and extremes of color range.
  - 4. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.
  - 5. Submit layout of control joint placement for Contracting Officer's approval prior to starting any work.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1.
- B. Qualifications:
  - 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
  - 2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.
- C. Mock-Up:
  - 1. Construct a sample wall panel of block masonry which will be exposed to view in the finished project, for approval by the Contracting Officer. Mock-up shall be as follows:
    - a. Approximately 4 feet long by 3 feet (high, showing the proposed color range, texture, bond, mortar, and workmanship. All block shipped for the sample shall be included in the panel.
    - b. Erect panel in the presence of the Contracting Officer before installation of materials.
    - c. When required, provide a separate panel for each type of block or mortar.
    - d. Do not start work until Contracting Officer has accepted sample panel.
    - e. Use panel as standard of comparison for all masonry work built of same material.
    - f. Do not destroy or move panel until work is completed and accepted by Contracting Officer.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Materials shall be delivered and stored to avoid damage from breakage, moisture, staining or damage of any kind.

#### 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
  - 1. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
  - 2. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

### PART 2 - PRODUCTS

#### 2.1 CONCRETE MASONRY UNITS

- A. Lightweight units used for non-load bearing walls, meeting requirements of ASTM C129, Type I. Provide units meeting fire resistance ratings.
- B. Lightweight units used for load bearing walls, meeting requirements of ASTM C90, Grade N, Type I. Provide units meeting fire resistance ratings.
- C. Units to be high precision block or split face block. Sizes as designated on Drawings. Colors selected from standard manufacturer's colors.
- D. Special shaped units, U-blocks, etc., shall meet same specifications as adjacent units.

## 2.2 CONCRETE BUILDING BRICK

- A. Concrete brick shall be solid units meeting ASTM C55, Type I, Grade N.

## 2.3 MORTAR

- A. Specified in Section 040514.

## 2.4 REINFORCING

- A. Horizontal reinforcing for concrete masonry units shall be mill galvanized, ladder type with 9-gauge parallel wires in each face and 9-gauge cross members a maximum of 24 inches on center, butt welded to side rods. Provide prefabricated corners and tees.
- B. Reinforcing bars for lintels shall meet ASTM A615, Grade 60.

## 2.5 CONTROL JOINTS

- A. Joint filler shall be preformed neoprene or poly-vinyl chloride.
- B. Control joint placement in non-reinforced masonry:
  - 1. Vertical control joints shall generally be located:
    - a. At major changes in wall height.
    - b. At changes in wall thickness.
    - c. At control joints in foundations, in roof, and in floors.
    - d. At chases and recesses for piping, columns, fixtures, etc.
    - e. At one or both sides of wall openings.
    - f. Near wall intersections.
    - g. Near return angles in L, T, and U-shaped structures.
  - 2. Maximum spacing of control joints shall be in no case exceed 24 feet.

## 2.6 CAVITY DRAINAGE PROTECTION MESH

- A. Recycled polyester/polyethylene trapezoidal-shaped 90% open mesh. Thicknesses to fit wall in accordance with the manufacturer's recommendations. Height as recommended by manufacturer, but not to exceed height of the top of the flashing. Product as manufactured by Mortar Net USA, Limited.

## 2.7 WEEP-HOLE VENT FILLER

- A. Three dimensional, ultraviolet resistant, weave of polyester. Size matching full head joint size of the masonry unit unless shown otherwise. Match existing color. Product as manufactured by Mortar Net USA, Limited or equal.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.



- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 PREPARATION

- A. Provide temporary bracing during installation of masonry Work. Maintain in place until building structure provides permanent bracing.
- B. Lay out work to avoid use of less than 8-inch x 8 inch faced units at jambs in exposed work.
- C. Lintel block shall extend into side walls at jambs, at least 8 inches.

### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Procedures for testing.
- B. Test and evaluate grout in accordance with ASTM C1019. See Section 040514 - Masonry Mortaring and Grouting.

### 3.4 INSTALLATION

- A. CMU Base Drainage Course: Lay base drainage course of CMU, consisting of 2 wythes separated by a cavity sized to accommodate through-wall flashing and mesh.
- B. Weep-Vents: Set weep-hole vent filler in place, aligning front of weep vent with exterior face of CMU. Apply adequate mortar to remainder of head joint, carefully removing excess mortar to prevent plugging of weep vent with mortar.
  - 1. Install weep-hole vent filler at drainage courses at base of wall and at all lintels and bond beams where through-wall flashing is required.
  - 2. Install weep-hole vent filler at top of wall and below lintels and bond beams to provide continuous air ventilation within wall.
- C. Mesh
  - 1. Select correct thickness of mesh for size of single-wythe CMU wall and thickness of cavity formed by drainage course units.
  - 2. Set mesh in cavity of drainage base course on either side of vertical reinforcing approximately 3 inches (7.5 cm) from the reinforcing on both sides. Set mesh against outside wythe units. No fasteners, adhesives are required, and mortar need not have set.
  - 3. Construct single-wythe CMU wall above the drainage course. Web-bed and face shell-bed the vertical grout cell to prevent migration of grout to adjoining cells.
  - 4. Grout reinforcing bar in place to within 1 inch (2.5 cm) of the top of the drainage course cavity. Install grout at reinforced cells in vertical lifts not to exceed 5 feet (1.5 m).
  - 5. Set mesh in similarly constructed drainage course at lintels and bond beams.
  - 6. Mesh may be compressed to allow insertion into cavities slightly smaller than its nominal thickness without affecting mesh or wall performance.

7. When forcing mesh into a tight-fitting cavity, ensure that mortar has set sufficiently to allow masonry units to resist outward pressure from product.
  8. Protect installed product from damage during construction.
- D. Mortar shall be thoroughly mixed and kept moist but shall not be retempered for use after initial set.
  - E. Lay only dry masonry units.
  - F. Use masonry saw for cutting exposed surfaces. Cut units to provide 1/8-inch clearance around electrical boxes and similar items.
  - G. Do not use chipped, cracked, or broken units.
  - H. Set units plumb, true to line, and level.
  - I. Adjust units to final position while mortar is soft and plastic. If unit is displaced after mortar has stiffened, remove unit, clean joints, and unit of mortar, and reset with fresh mortar.
  - J. When joining fresh work to set or partially set masonry clean exposed surface and remove loose mortar before laying fresh masonry.
  - K. When necessary to stop a horizontal, run rack back one-half block length in each course, do not tooth.
  - L. Unless indicated otherwise partitions shall extend from floor to bottom of floor or roof construction above.
  - M. Where rated partitions run perpendicular to deck, fill voids at deck with grout.

### 3.5 BOND

- A. Lay units in running bond with vertical joints centered on unit in course below unless indicated otherwise on drawings.

### 3.6 MORTAR BEDS

- A. Lay hollow units with full mortar coverage on horizontal and vertical face shells. Provide full mortar coverage on horizontal and vertical face shells and webs where adjacent to cells or cavities to be filled with grout and on starting courses.
- B. Lay block with full horizontal and vertical joints.

### 3.7 WIRE REINFORCEMENT

- A. Wire Reinforcements shall be placed as follows:
  1. Four-inch concrete block walls with ends adjoining other partitions.
    - a. Concrete block on slab on grade - continuous horizontal reinforcements 24 inches on center vertically (every third course).
    - b. Concrete block on slabs above grade - Continuous horizontal reinforcement 16 inches on center vertically (every other course).
  2. Eight-inch concrete block walls
    - a. Concrete block walls on slab on grade - continuous horizontal reinforcement 16 inches on center vertically (every other course).

- b. Concrete block walls on slabs above grade - continuous horizontal reinforcements 24 inches on center vertically (every third course).
- 3. Wire reinforcement shall be completely embedded in mortar or grout. Joints with wire reinforcement shall be at least the thickness of the wire.
- 4. Wire reinforcement shall be lapped at least 8 inches at splices and shall contain at least one cross wire of each piece of reinforcement in the lapped distance.

### 3.8 JOINTS

- A. Nominal thickness shall be 3/8 inch (9 mm) and uniform.
- B. Shove vertical joints tight.
- C. Strike joints flush in surfaces to be exposed or painted.
- D. Tool joints slightly concave in surfaces to be exposed or painted.

### 3.9 BUILT-UP WORK

- A. Cooperate with other trades in building in items in masonry work.
- B. Grout solid around built-in items and in door frames.

### 3.10 LINTELS

- A. Install rebars and grout solid as indicated. Provide temporary shoring for openings wider than 36 inches.
- B. Lintel blocks shall extend into side walls at jambs, minimum at 8 inches.

### 3.11 CLEANING AND POINTING

- A. Dry brush masonry surfaces after mortar have set, at end of each day's work and after final points.
- B. Cut out and repaint defective joints.
- C. At final completion of masonry work fill holes in joints and tool to match adjacent work.
- D. Leave work and surrounding surfaces clean and free of mortar spots and droppings.

END OF SECTION

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## SECTION 054000

### COLD-FORMED METAL FRAMING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Load bearing and metal stud wall and partition framing, with anchorage and bracing.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

##### 1.2 REFERENCES

- A. American Iron and Steel Institute (AISI)
  - 1. Specification for the Design of Cold-Formed Steel Structural Members.
  - 2. Cold-Formed Steel Design Manual (Latest).
- B. American National Standards Institute (ANSI).
  - 1. ANSI A58.1 - Roof, Wind and Snow Loads.
- C. American Society for Testing and Materials (ASTM):
  - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A1101- Hot-Rolled Carbon Steel Sheet & Strip, Carbon Hot-Rolled Structural Quality.
  - 3. ASTM A1008- Standard Specification for Structural Steel Sheet, Carbon, Cold-Rolled.
  - 4. ASTM C955 - Standard Specification for Load Bearing Steel Studs, Runners (Track), Bracing, and Bridging for Screw Application of Gypsum Panel Products.
- D. American Welding Society (AWS):
  - 1. AWS D1.1 - Structural Welding Code and D1.3 - Specifications for Welding Sheet Steel in Structures.
  - 2. AWS - Standard Qualification Procedure.
- E. Federal Specification.
  - 1. FS TT-P-636C - Rust-Inhibitive Paint.
- F. Metal Lath/Steel Framing Association (ML/SFA) - Lightweight Steel Framing Systems Manual, Latest Edition.

##### 1.3 SYSTEM DESCRIPTION

- A. Design Requirements: The supplier shall design and/or verify the size and strength of all light gauge cold-formed Metal Framing members and connections in accordance with the ML/SFA Lightweight Steel Framing Systems Manual.
  - 1. Design shall use the superimposed design loads specified in the Design Criteria section of the Structural General Notes in the Contract Drawings.
  - 2. Design shall be based upon information shown on the drawings and specified herein.
  - 3. Additional Design Criteria - ANSI A58.1 or:

- a. Load-bearing live loads:
  - 1) Load-bearing partitions:
    - i. Lateral pressures: 5 psf
  - 2) Non-load-bearing partitions:
    - i. Lateral pressures: 5 psf
  - 3) Exterior curtain walls:
    - i. Wind loads based on wind speeds of 115 MPH.
  - 4) 4) Maximum allowable deflection with brick veneer:
    - i. Calculated on 18 ga. stud capacity alone: 1/600.
- 4. Design shall conform to: AISI Specification for the Design of Cold-Formed Steel Structural Members. Wall bridging shall be designed to provide resistance to minor axis bending and rotation of wall studs. Designated selected exterior and/or interior walls shall be designed to provide frame stability and lateral load resistance. All connections (member to member, and member to structure) shall be designed and detailed.
- 5. Qualification of Field Welding: Qualify welding process and welding operators in accordance with AWS Standard Qualification Procedure.
- 6. Design non-axial load-bearing framing to accommodate 1/2 inch vertical deflection.

#### 1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. All shop drawings and calculations must bear the seal and signature of an engineer registered in the jurisdiction where project is being constructed.
  - 2. Product Data:
    - a. Manufacturers' literature containing product and installation specifications and details.
  - 3. Shop Drawings:
    - a. Documents illustrating materials, shop coatings, steel thickness, details of fabrication and erection, details of attachment, spacing of fasteners, required accessories and critical installation procedures.
  - 4. Calculations:
    - a. Engineering calculations or data verifying the framing assembly's ability to meet or exceed design requirements as stated here-in and required by local codes, prepared under the supervision of a Professional Engineer.
  - 5. Assurance/Control Submittals:
    - a. Test Reports: Submit the following reports directly to Contracting Officer from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements:
      - 1) Testing/Inspection reports conducted on shop and field-bolted and welded connections. Include data on type(s) of tests conducted and test results. Note inspection findings.
    - b. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - c. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.

#### 1.5 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
  - 2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.
- B. Pre-Installation Meetings:

1. Convene a pre-installation meeting one week prior to commencing Work of this Section. Notify the Architect and Contracting Officer of the meeting date and time at least 7 days prior.
2. Require attendance of parties directly affecting Work of this Section.
3. Review conditions of operations, procedures and coordination with related Work.
4. Agenda:
  - a. Tour, inspect, and discuss conditions of installation of other work including door and window frames and mechanical and electrical work.
  - b. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.
  - c. Review required submittals, both completed and yet to be completed.
  - d. Review Drawings.
  - e. Review and finalize construction schedule related to cold formed metal framing installation and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
  - f. Review required inspections, testing, certifying, and material usage accounting procedures.
  - g. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
  - h. Review safety precautions relating to operations.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Protect metal framing units from rusting and damage. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade. Store off ground in a dry ventilated space or protect with suitable waterproof coverings and protect against mechanical damage to units. Store materials on a flat plane. Any damaged materials shall be removed from the site.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. All studs and/or joists and accessories shall be of the type, size, gauge and spacing shown on the plans or as required by manufacturer design, if called for. Studs, runners (track), bracing, and bridging shall be manufactured per ASTM Specification C-955.
- B. All painted studs, joists and accessories shall be formed from steel that conforms to the requirements of ASTM A570 or A611, as set forth in Section 1.2 of the AISI Specification for the Design of Cold-Formed Steel Structural Members (latest edition).
- C. All galvanized studs, joists and accessories shall be formed from steel that conforms to the requirements of ASTM A653, as set forth in Section 1.2 of the AISI Specification for Design of Cold-Formed Steel Structural Members (latest edition).
- D. All painted studs, joists and accessories shall be prime-painted with a rust-inhibitive paint, FS TT-P-636C.
- E. All galvanized studs, joists and accessories shall have a minimum G-60 coating.
- F. All section properties shall be calculated in accordance with the AISI Specification for the Design of Cold-Formed Steel Structural Members (latest edition).
- G. Framing Accessories:
  1. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:

- a. B&D Industries, LLC, Albany, NY (800) 924-4807.
- b. Deitrich, Pittsburgh, PA (800) 873-2443.
- c. The Steel Network, Incorporated., Raleigh, NC (888) 474-4876.
- 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- 3. Interior or Exterior non-axial-load-bearing Wall Head Condition Deflection Accessories:
  - a. Deitrich: Double-Deep-Leg Track.
  - b. The Steel Network:
  - c. VertiClip SLD (interior), SL (exterior).
- 4. Exterior non-axial-load-bearing Wall Slab Bypass Deflection Accessories:
  - a. B&D: Quick Clip.
  - b. The Steel Network: VertiClip SLB or SLS Series.

## 2.2 FABRICATION

- A. General: Framing components may be prefabricated prior to erection. Fabricate components plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated components in a manner to prevent damage or distortion.
- B. Fastenings: Attach similar components by welding. Attach dissimilar components by bolting, or screw fasteners, as standard with manufacturer.
- C. Cutting of steel framing members may be accomplished with a saw or shear. Torch cutting of load carrying members is not permitted.
- D. Wire tying of framing components is not permitted.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION AND STUDWALLS

- A. Manufacturer's Instructions: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations, unless otherwise indicated.
- B. Stud Walls:
  - 1. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24 inches on center spacing for nail or power-driven

- fasteners, or 16 inches on center for other types of attachment. Provide fasteners at corners and ends of tracks.
2. Position studs plumb in runners and space no greater than 16 inches and not more than 2 inches from abutting walls and at each side of openings. Connect studs to upper and lower tracks using self-drilling, screws or welding in accordance with Manufacturer's recommendations such that the connection meets or exceeds the design loads required at that connection.
  3. Brace all studs at mid-height for added strength, stiffness, and fire-stopping.
  4. Construct corners using minimum of three studs. Double studs at door, window, and sidelight jambs. Install intermediate studs above and below openings to match wall stud spacing.
  5. Provide deflection allowance below supported horizontal building framing in ceiling or head track for non-load-bearing framing in a method recommended by stud manufacturer.
    - a. Where walls and partitions must close out against the deck for smoke and fire separation provide a top track rigidly attached to vertical studs but free to move vertically in a 14-gauge break-formed deep leg track rigidly attached to deck with slack to accommodate structural live load deflections noted on drawings; or head condition vertical slide clips in coordination with alignment track (20 gage at exterior walls, 25 gage at interior walls).
    - b. Where wall or partition studs pass by the structural deck provide vertical slide clips welded or screw attached to the structural support but do not attach rigidly to studs.

### 3.3 INSTALLATION: PREFABRICATED AND PANELIZED CONSTRUCTION

- A. Panels shall be designed to resist construction and handling loads as well as service loads.

### 3.4 INSTALLATION: NON-PANELIZED (STICK-BUILT) MEMBERS

- A. Align track accurately at supporting structure and fasten to structure as shown on shop drawings.
- B. Track intersections shall butt evenly.
- C. Studs shall be plumbed, aligned, and securely attached to flanges or webs of upper and lower tracks. Axially loaded studs shall be seated squarely in both top and bottom tracks.

### 3.5 INSTALLATION: JOISTS

- A. Joist shall be located directly overbearing studs or a load distribution member shall be provided to transfer loads.
- B. Provide web stiffeners where necessary at reaction points, and at points of concentrated loads, as shown on the shop drawings.
- C. Bridging, either strap or solid, shall be provided as shown on the shop drawings.
- D. Provide additional joists under parallel partitions where the partition length exceeds 1/2 of the joist span.
- E. Provide additional joists around all floor/roof openings which are larger than the joist spacing and as noted on the shop drawings.
- F. End blocking shall be provided where joist ends are not otherwise restrained from rotation.

### 3.6 FASTENINGS AND ATTACHMENTS

- A. Anchorage of the tracks to the structure shall be with methods designed for the specific application of sheet to that surface. Size, penetration, type and spacing shall be determined by design.



- B. Welds shall conform to the requirements of AWS D1.1, AWS D1.3, and AISI Manual Section 4.2. Welds may be butt, fillet, spot, or groove type, the appropriateness of which shall be determined by, and within the design calculations. All welds shall be touched-up using zinc rich paint to galvanized members, and paint similar to that used by the manufacturer for painted members.
- C. Steel drill screws shall be of the minimum diameter indicated by the design of that particular attachment detail. Penetration through joined materials shall not be less than 3 exposed threads.
- D. Wire tying in structural applications is not permitted.

### 3.7 CONSTRUCTION

- A. Site Tolerances:
  - 1. Vertical alignment (plumbness) of studs shall be within 1/960th (1/8 inch in 10.0 inches) of the span.
  - 2. Horizontal alignment (levelness) of walls shall be within 1/960th (1/8 inch in 10.0 inches) of their respective lengths.
  - 3. Spacing of studs shall not be more than  $\pm 1/8$  inch from the designed spacing providing that the cumulative error does not exceed the requirements of the finishing materials.
  - 4. Squareness - Prefabricated panels shall not be more than 1/8 inch out of square within the length of that panel.

### 3.8 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
  - 1. Inspect all work in order to assure strict conformance to the shop drawings at all phases of construction.
  - 2. All members shall be checked for proper alignment, bearing, completeness of attachments, proper placement, reinforcement, etc.
  - 3. All attachments shall be checked for conformance with the shop drawings. All welds shall be touched-up as specified herein.
  - 4. General Inspection of structure shall be completed prior to applying loads to those members.
  - 5. Inspections where and as required by local codes shall be controlled inspections.

END OF SECTION

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SECTION 055000  
METAL FABRICATIONS

PART 1 - GENERAL

1.1. SUMMARY

- A. Miscellaneous steel that is not covered in Section 051200.
- B. Door frames for special doors.
- C. Stairs, landing sand associated guardrails and handrails.
- D. Ladders.
- E. Loose lintels and shelf angles.
- F. Pipe bollards.
- G. Metal joint covers.
- H. Interior pedestrian guardrails
- I. Pipe bollard plastic covers

1.2 SUBMITTALS

- A. Shop Drawings: Required
- B. Samples: Required
- C. Product Data: Required

1.3 QUALITY ASSURANCE

- A. Quality Standards: Comply with ASTM and AISC requirements.
- B. Regulatory Requirements:
  - 1. Design stair assembly to support live load of 100 pounds per square foot with deflection of stringer or landing framing not to exceed 1/240 of span.
  - 2. Design guardrail system for the following loads applied to the top rail:
    - a. Uniform load of 50 pounds per linear foot applied horizontally and concurrently with uniform load of 100 pounds per linear foot applied vertically downward.
    - b. Concentrated load of 250 pounds applied at any point and in any direction.
    - c. Concentrated and uniform loadings shall not be applied simultaneously.
  - 3. Design handrails for the following loads:
    - a. Uniform load of 50 pounds per linear foot applied in any direction.
    - b. Concentrated load of 250 pounds applied at any point and in any direction.
    - c. Concentrated and uniform load shall not be applied concurrently.
  - 4. Conform to applicable Building Code and OSHA requirements.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Structural Steel Members: Conform to ASTM A 36.
- B. Tubing, Pipe: Conform to ASTM A 53.
- C. Sheet: Conform to ASTM A 568.
- D. Welding: Conform to AWS D1.1 "Structural Welding Code."
- E. Bolts, Nuts and Washers: Conform to ASTM A 307.
- F. Handrail Fittings: Cast or Machined steel.
- G. Pipe Bollard: 6" dia., Schedule 40 pipe, concrete filled with end cap.
- H. Extruded Aluminum: ASTM B 221
- I. Interior Pedestrian Guardrail: W beam rail elements fabricated from corrugated sheet steel conforming to AASHTO M 180, Type 3, Class A with W6 x 9 post and base plate for bolted connection to slab.
- J. Anchors and Fasteners for Aluminum: Stainless Steel, ASTM A 304
- K. Pipe Bollard Plastic Covers: Exterior shell cover of low-density polyethylene and interior steel sleeve. Covers are to be 1/4-inch nominal wall thickness with ultraviolet and anti-static additives and a dome top. Install over steel pipe posts as indicated on Drawings. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Ideal Shield, L.L.C., Detroit, MI (313) 842-7290, (800) 731-1722.
  - 2. Liberty Equipment Sales, Houston, TX (281) 987-8708, (888) 987-8708.

### 2.2 FABRICATION

- A. Stairs and Landings:
  - 1. Closed risers and concrete filled metal pan treads construction.
  - 2. Form treads, landings, and riser of sheet steel stock.
  - 3. Form stringers with rolled steel channels or rectangular hollow sections.
- B. Handrails:
  - 1. Form posts and railings from steel pipe sections.
- C. Shop/Factory Finishing:
  - 1. Interior components: Prime painted.
  - 2. Exterior components: Galvanized.

### 2.3 FIELD QUALITY CONTROL

- A. Field Test: If required by Local codes.
- B. Field Inspection: If required by Local codes.

### 2.4 SCHEDULES

- A. Door Frames for Exterior Overhead Door Openings: Channel sections; galvanized finish.

- B. Frames for Interior Impact, Overhead Coiling and Rapid Roll-up Doors: Channel sections; primed finish.
- C. Dock leveler edge angles: Galvanized finish.
- D. Dock edge channels: Galvanized finish.
- E. Pipe bollards: Primed finish for interior and galvanized finish for exterior.
- F. Interior Pedestrian Guardrails: primed finish with safety yellow topcoat.
- G. Interior ladders: Primed finish.
- H. Exterior ladders: Galvanized finish.
- I. Stair nosing at concrete stairs: Provide cast non-corrosive metal safety nosing (minimum 3" x 3/8") with cross-hatched abrasive surface and integrally cast anchors at each exposed concrete stair tread.
- J. Expansion joint covers: Extruded aluminum clear anodized finish.
- K. Loose steel lintels in masonry openings: Galvanized finish, exterior; primed finish, interior.
- L. Shelf angles: Galvanized finish.

### PART 3 - EXECUTION

- 3.1 INSTALL ALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES AND PRINTED INSTRUCTIONS.

END OF SECTION

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## SECTION 055213

### PIPE AND TUBE RAILINGS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Steel pipe handrails.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections:
  - 1. Section 099100 - Painting: Field paint finish.

##### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM A 53 - Specification for Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
  - 2. ASTM 123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM E 894 - Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
  - 4. ASTM E 935 - Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
  - 5. ASTM E 985 - Permanent Metal Railing Systems and Rails for Buildings.
- B. Steel Structures Painting council (SSPC):
  - 1. SSPC Paint 15 - Type 1, Red Oxide.
  - 2. SSPC Paint 20 - Type 1 Inorganic Zinc Rich.

##### 1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. Design, engineer, fabricate and install handrails and railing systems to comply with requirements of ASTM E 985 for structural performance based on testing performed in accordance with ASTM E 894 and E 935.
  - 2. Railing assembly, wall rails, and attachments to comply with local code requirements and to resist minimum lateral force according to IBC or more stringent local building code at any point without damage or permanent set.

##### 1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
  - 2. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Pipe: ASTM A 53, Grade B Schedule 80.
- B. Rails and Posts: Steel pipe; with welded joints, of sizes and shapes as indicated on Drawings.
- C. Fittings: Elbows, T-shapes, wall brackets, escutcheons; machined steel.
- D. Mounting on Concrete Floor: Steel sleeves, sized to receive railing post with 1/4 inch clearance.
- E. Mounting on Masonry or Concrete Walls: Brackets with anchors for building in masonry.
- F. Mounting on Stud Walls: Brackets and anchor plates, predrilled to receive bolts.
- G. Splice Connectors: Steel threaded collars.

### 2.2 FABRICATION

- A. Fit and shop assemble sections in largest practical sizes, for delivery to site and installation.
- B. Supply components required for secure anchorage of handrails and railings.
- C. Fully weld joints. Grind exposed welds smooth and flush with adjacent surfaces.
- D. Wake exposed joint butt tight, flush, and hairline.
- E. Accurately form components required for anchorage of railings to each other and to building structure.
- F. Prime railings which will be exposed.

### 2.3 FINISH

- A. At Building Exterior:
  - 1. Galvanizing: ASTM A123; provide minimum 2.0 ounces per square foot.
  - 2. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I Inorganic zinc rich.
- B. At Building Interior: SSPC 15, Type 1, red oxide.
- C. Field paint as specified in Section 099100.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.

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- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify field dimensions prior to shop fabrication.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 PREPARATION

- A. Furnish items required to be cast into concrete, embedded in masonry, placed in partitions with setting templates, to appropriate Sections.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's published instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Anchor railings to structure with anchors in conformance with ASTM E 985.
- D. Field weld anchors as indicated on Drawings. Touch-up welds with primer. Grind welds smooth.
- E. Insert railing posts in sleeves and pack sleeves with non-shrink grout.

### 3.4 CONSTRUCTION

- A. Site Tolerances:
  - 1. Maximum Variation From Plumb: 1/4 inch.
  - 2. Maximum Offset From True Alignment: 1/4 inch.
  - 3. Maximum Out-of-Position: 1/4 inch.

### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Inspect railings and handrail installation and attachment to structure.
- C. Inspect paint finish applied to surfaces.

END OF SECTION

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SECTION 061000  
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Wood blocking, cants, and nailers.
  - 2. Plywood backing panels.
  - 3. Miscellaneous deadwood.
  - 4. Wood – preservative – treated materials.
  - 5. Fire – retardant – treated materials.

1.2 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. SPIB: The Southern Pine Inspection Bureau.
  - 2. WCLIB: West Coast Lumber Inspection Bureau.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
  - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
  - 1. Preservative – Treated Wood.
  - 2. Fire – Retardant – Treated Wood.

PART 2 - PRODUCTS



## 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
  2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
  3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  4. Provide dressed lumber, S4S, unless otherwise indicated.

## 2.2 WOOD TREATMENT

- A. Preservative Pressure Treated Lumber, Alkaline Copper Quat (ACQ): Type B, Ammoniacal Copper Quat or Type D, Amine Copper Quat.
1. Manufacturers:
    - a. Chemical Specialties, Incorporated, Charlotte, NC (800) 421-8661.
    - b. Arch Wood Protection, Inc., Smyrna, GA (770) 801-6600
    - c. Kippers Performance Chemicals., Griffin, GA, (770) 233-4200
  2. Products:
    - a. CSI: "Preserve".
    - b. Arch Wood: "Natural Select"
    - c. Koppers: "Nature Wood"
  3. Impregnate lumber with preservative treatment conforming to AWPA Standard C1 and P5. Apply the preservative in a closed cylinder by pressure process in accordance with AWPA Standard C15.
  4. Retention of preservative:
    - a. Moderate service conditions (weather exposure): 0.25 pounds per cubic foot (oxide basis).
    - b. Severe conditions (constant contact with ground or water): 0.40 pounds per cubic foot (oxide basis).
  5. Remove excess moisture where shrinkage is a serious fault or where treated lumber will be in contact with plaster, or stucco, and where water-borne treated lumber is to be painted or stained.
  6. Lumber shall be dried to 15 to 19 percent moisture content after treatment, and material to be painted or stained shall have knots and pitch streaks sealed as with untreated wood.
  7. Liberally brush freshly cut surfaces, bolt holes and machined areas with the same preservative in accordance with AWPA Standard M4.
  8. Treatment material shall provide protection against termites and fungal decay and shall be registered for use as a wood preservative by the U. S. Environmental Protection Agency.
- B. Fire Retardant Treatment:
1. Manufacturers:
    - a. Chemical Specialties, Incorporated, Charlotte, NC (800) 421-8661.
    - b. Hickson Corporation, Smyrna, GA: (770) 801-6600.
    - c. Hoover Treated Wood Products, Incorporated, Thomson, GA: (800) 832-9663.
  2. Products:
    - a. CSI: "D-Blaze".
    - b. Hickson: "Dricon".
    - c. Hoover: "Pyro-Guard".
  3. Lumber and plywood shall be treated as follows:
    - a. Each piece of treated material shall bear the UL FR-S rating (flame spread, and smoke developed less than 25) indicating compliance with an extended 30-minute tunnel test in accordance with ASTM E84 or UL 723.

- b. After treatment, all lumber shall be dried to an average moisture content of 19 percent or less.
  - c. After treatment, all plywood, shall be dried to an average moisture content of 15 percent or less.
  - d. All treated material shall meet interior Type A requirements in AWPA standard C-20 for lumber and C-27 for plywood.
  - e. Chemicals used to treat material shall be free of halogens, sulfates and formaldehyde.
- C. Wood Requiring Treatment:
- 1. Lumber, Preservative Treated: Nailers, blocking, stripping, and similar items in conjunction with roofing, flashing, and other construction. Sills, blocking, furring, stripping, and similar items in contact with masonry or concrete
  - 2. Lumber, Fire Retardant Treated: Interior framing, furring, blocking, nailers, and miscellaneous exposed wood. Do not treat furring in contact with masonry or concrete.
  - 3. Interior Plywood, Fire Retardant Treated: Exterior type plywood backing for electrical and telephone equipment. See Evaluations in Division 06 Section "Rough Carpentry" for information about treatment chemicals.

### 2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
  - 2. Nailers.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades: Mixed southern pine, No. 2 grade; SPIB.
- D. For blocking not used for attachment of other construction Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

### 2.4 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

### 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F1667.

- C. Wood Screws: ASME B18.6.1.
- D. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Bolts: Steel bolts complying with ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.
- G. 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 E488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F738M and ASTM F836M, Grade A1 or A4).

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- D. Do not splice structural members between supports, unless otherwise indicated.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- G. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

### 3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

### 3.3 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

USPS MPF Specification

## SECTION 064116

### PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Custom wood casework with plastic laminate finish.

##### 1.2 REFERENCES

- A. Architectural Woodwork Quality Standards (AWI)
  - 1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute.
- B. ANSI
  - 1. ANSI 161.2-79: Performance Standard for Fabricated High Pressure Decorative Laminate Countertops.

##### 1.3 SUBMITTALS

- A. Product Data: Required for all manufactured products.
- B. Shop Drawings: Required for all fabricated sections of millwork.
- C. Samples: Required of all manufactured products.

##### 1.4 QUALITY ASSURANCE

- A. AWI Section 400 requirements for custom grade finish overlay laminate – clad cabinets and countertops.
- B. Fabricator: Company specializing in fabrication of millwork with a minimum of 5 years documented experience.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURERS

- A. All materials to be following AWI 400 requirements.

#### PART 3 - EXECUTION

##### 3.1 EXAMINATION

- A. Execution Requirements: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION

- A. Install all millwork to AWI tolerances and requirements.

END OF SECTION

USPS MPF Specification

SECTION 072100  
THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Perimeter and cavity wall insulation.
- B. Loose insulation.
- C. Batt insulation.
- D. Fiberglass board insulation

1.2 SUBMITTALS

- A. Product Data: Required.
- B. Samples: Required.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Conform to ASTM E 119 and ASTM E 84 for Fire-Resistance Ratings and Surface Burning Characteristics respectively.
- B. Products containing Urea- Formaldehyde are prohibited.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source: Celotex, CertainTeed, Owens-Corning or approved equal.
- B. Perimeter and Cavity Wall Insulation: Extruded cellular type polystyrene insulation board complying with ASTM C578 Type 25PSI R value 5.0 (per inch of thickness).
- C. Loose Insulation: No CFCs allowed.
  - 1. Granular Insulation: Vermiculite perlite type, water repellent, fire resistant.
  - 2. Beaded Polystyrene: Loose polystyrene beads.
  - 3. Insulation Inserts: Rigid Polystyrene inserted in factory.
- D. Batt Fiberglass Insulation with 25% recycled glass: Foil faced glass fiber batts complying with ASTM C-578 Type III R of 11.0 (per 3-inch thickness).
- E. Fiberglass Board Insulation: Thermal insulation complying with ASTM C612, Type IA or Type IA and IB, nominal density of 4 lb./cu. ft.

Adhesive: Type recommended by insulation manufacturer.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Foundation perimeter-board insulation:
  - 1. Install boards on foundation perimeter with adhesive.
  - 2. Tape insulation board joints.
- B. Exterior walls - board insulation:
  - 1. Install boards on wall surface.
  - 2. Tape insulation board joints.
- C. Exterior walls - loose fill insulation:
  - 1. Place in lifts not exceeding 6 feet pouring height.
- D. Perimeter Insulation: Extruded polystyrene, adhesive application, plus ½ inch (13 mm) thick protection board or applied interior without protection.
- E. Vermiculite or polystyrene insulation is to be placed in masonry cores when required to meet the minimum U - Value requirements.

END OF SECTION

USPS MPF Specification



## SECTION 078400

### FIRESTOPPING

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Firestopping in fire-rated wall assemblies.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

#### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM E 119 - Test Methods for Fire Tests of Building Construction and Materials.
  - 2. ASTM E 814 - Test Methods for Fire Tests of Through Penetration Fire Stops.
- B. Underwriters' Laboratories, Inc. (UL):
  - 1. UL 1479 - Fire Tests of Through-Penetration Firestops.

#### 1.3 DEFINITIONS

- A. Firestopping: Sealing material or assembly placed in spaces between building materials to stop movement of smoke, heat, gasses, or fire through wall openings.

#### 1.4 SYSTEM DESCRIPTION

- A. Firestopping Materials: ASTM E 119, ASTM E 814, UL 1479 to achieve a fire rating as indicated on Drawings.

#### 1.5 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures of submittals.
  - 1. Product Data: Product characteristics, performance, and limitation criteria.
  - 2. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - b. Qualification Documentation: Firestopping installer documentation of experience indicating compliance with specified qualification requirements.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this Section with minimum 5 years documented experience.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver Products in manufacturer's original unopened containers or packages with labels intact, identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions, where applicable.
- B. Store and handle materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

## 1.8 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
  1. Do not install materials when temperature of substrate material and ambient air is below 60 degrees F.
  2. Maintain minimum temperature before, during, and for 3 days after installation of materials.
  3. Keep away from heat, open flame, sparks, or other sources of ignition until curing is complete. Use only with adequate ventilation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturer's offering firestopping materials which may be incorporated in the work include the following:
  1. Nelson Firestop Products, Tulsa, OK (800) 331-7325.
  2. Hilti Firestop Systems, Tulsa, OK (800) 879-8000.
  3. The Rectorseal Corporation, Houston, TX (800) 231-3345.
  4. Specified Technologies, Incorporated (STI), Somerville, NJ (800) 992-1180.
  5. 3M Fire Protection Products, St. Paul, MN (800) 328-1687.
  6. Tremco Firestop System, Beechwood, OH (800) 321-7906.
  7. Specified Technologies, Inc., Somerville, NJ (800) 992-1180.
- B. Other products such as USG Firestop System by U.S. Gypsum Co. are acceptable if complying with requirements.
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 MATERIALS

- A. Intumescent Latex Sealant: Single-component, intumescent, latex formulation.
  1. LBS, by Nelson Firestop Products.
  2. Metacaulk 950 or 1000, by RectorSeal.
  3. SpecSeal SSS100, by STI.
  4. CP 25WB+, by 3M.
  5. TREMstop WBM, by Tremco.
- B. Intumescent Solvent-Release-Curing Sealant: Single component, intumescent, synthetic-polymer based, non-sag grade.
  1. CP 25N/S, by 3M.
  2. TREMstop WBM, by Tremco.
- C. Intumescent Wrap/Strip: Single-component, elastomeric sheet with aluminum foil on one face.
  1. WRS, by Nelson Firestop Products.
  2. Metacaulk Wrap Strip, by RectorSeal.
  3. SpecSeal SSWRED Wrapstrip, by STI.

4. FS-195+ Wrap/Strip, by 3M.
  5. TREMstop WS, by Tremco.
- D. Intumescent Putty: Single-component, non-hardening, dielectric, intumescent putty.
1. FSP, by Nelson Firestop Products.
  2. Metacaulk Fire Rated Putty, by RectorSeal.
  3. SpecSeal Putty, by STI.
  4. Moldable Putty+, by 3M.
- E. Silicone Sealant: Single-component, moisture-curing, silicone-based elastomeric, non-sag grade.
1. CLK N/S, by Nelson Firestop Products.
  2. FS 601, by Hilti.
  3. Metacaulk 835+, by RectorSeal.
  4. SpecSeal PEN 300, by STI.
  5. 2000+ Silicone, by 3M.
  6. FYRE SIL, by Tremco.
- F. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, nonshrinking foam.
1. FS Fireblocks, by Hilti.
  2. SpecSeal PEN 200, by STI.
  3. 2001 Silicone RTV Foam, by 3M.
- G. Intumescent Collar: Factory-fabricated, intumescent collar.
1. PCS, by Nelson Firestop Products.
  2. CP 642, by Hilti.
  3. Metacaulk Pipe Collar, by RectorSeal.
  4. SpecSeal SSC Collars, by STI.
  5. Plastic Pipe Device, by 3M.
  6. TREMstop D, by Tremco.
- H. Intumescent Composite Sheet or Pillows and Mortar: Intumescent sheet used to firestop large openings.
1. CPS, by Nelson Firestop Products.
  2. SpecSeal SSB Pillows and SpecSeal SSM Firestop Compound, by STI.
  3. CS-195+ Composite Sheet, by 3M.
  4. TREMstop PS, by Tremco.
- I. Fire Rated Cable Pathway Device for low voltage and optical fiber cabling.
1. EZ-Path Firestop System by Specified Technologies, Inc.
- J. Packing Material: Manufacturer's standard mastic, putty, ceramic fiber blanket, or mineral wool to be used as fill or backing material for firestopping.
1. FSB or Mineral Wool, by Nelson Firestop Products.
  2. Mineral Wool, by Hilti.
  3. Fire Safing or Backer Rod, by RectorSeal.
  4. Mineral Wool Safing, by STI.
  5. FireMaster Mastic, FireMaster Putty, or FireMaster Bulk, by 3M.
  6. Cerablanket, by Tremco.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.

- B. Verification of Conditions: Verify that field measurements, surfaces, and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to United States Postal Service.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.
- C. Place hangers or damming materials in penetration to hold firestopping materials where required.

3.3 INSTALLATION

- A. Follow manufacturer charts for appropriate material to achieve required fire rating in various locations.
- B. Install firestopping at penetrations of fire rated wall materials by sleeves, piping, ductwork, conduit, and other items in accordance with manufacturer's published instructions.

3.4 CLEANING AND PROTECTION

- A. Clean excessive 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.
- C. If damage occurs, cut out and remove damaged or deteriorated firestopping and install new materials.

3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Inspection procedures.
- B. Contracting Officer will inspect each firestopping installation. Do not cover firestopping installations that will be concealed by other construction until Contracting Officer inspection.

3.6 SCHEDULES

- A. Provide firestopping complying with UL assemblies specified below.

Penetration	Assembly	Nelson	Hilti	RectorSeal	STI	3M	Tremco
Metal Pipe	CMU Wall 8" Thick or Less	CAJ1224 or CAJ1203	CAJ1150 or CAJ1158	CAJ1114 or CAJ1115	CAJ1079 or CAJ1217	CAJ1001 or CAJ1009	CAJ1179 or CAJ1187

	Gypsum Board Partition	WL1083 or WL1030	WL1052 or WL1054	WL1026 or WL1034	WL1049 or WL1079	WL1003 or WL1009	WL1020 or WL1051
Non-Metallic Pipe	CMU Wall 8" Thick or Less	CAJ2086	CAJ2095 or CAJ2109	CAJ2021 or WJ2025	CAJ2064 or CAJ2045	CAJ2005	CAJ2082 or FA2024
	Gypsum Board Partition	WL2071	WL2078	WL2015 or WL2104	WL2093 or WL2029	WL2002 or WL2005	WL2083 or WL2082
Cable Tray	CMU Wall 8" Thick or Less	CAJ8049 or CAJ4033	CAJ4017	CAJ8043	CAJ4020 or CAJ4029	CAJ4003 or CBJ4020	CAJ4007 or WJA4005
	Gypsum Board Partition	WL4003	WL4006	N/A	WL4005 or WL4008	WL4004	WL3043 or WL3044
Insulated Metal Pipe	CMU Wall 8" thick or Less	CAJ5008 or CAJ5059	CAJ5045	WJ5016 or CAJ5070	CAJ5021 or CAJ5029	CAJ5001 or CAJ5002	CAJ5052 or CBT5005
	Gypsum Board Partition	WL5036	WL5022 or WL5029	WL5057	WL5014 or WL5051	WL5001	WL5034
Construction Gaps	CMU Wall to Metal Deck	N/A	HW-D-0008	TRC/PV120-14	U900Z020	U900Z028	U900Z013 or U900Z014
	Gypsum Board Partition to Metal Deck	N/A	HW-D-0003 or HW-D-0004	HWD0014 or TRC/PV120-14	HWD1001	U400V	WHPV60.01 or U900Z014

END OF SECTION

USPS MPF Specification

## SECTION 079200

### JOINT SEALANTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Preparing sealant substrate surfaces.
  - 2. Sealant and backing.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 033000 - Cast-In-Place Concrete: Sealants used in conjunction with concrete.
  - 2. Section 042200 – Concrete Unit Masonry: Sealants used in conjunction with concrete masonry.
  - 3. Section 078400 - Firestopping: Firestopping sealant at fire-rated assemblies.
  - 4. Section 088000 - Glazing: Sealants used in conjunction with glazing methods.

##### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C717 - Standard Terminology of Building Seals and Sealants.
  - 2. ASTM C834 - Specification for Latex Sealants.
  - 3. ASTM C920 - Specification for Elastomeric Joint Sealants.
  - 4. ASTM D1056 - Flexible Cellular Material- Sponge or Expanded Rubber.
- B. Federal Specifications (FS):
  - 1. FS SS-S-200 - Sealing Compounds, Two Component, Elastomeric, Polymer Type, Jet-Fuel Resistant, Cold Applied.
  - 2. FS TT-S-1657 - Sealing Compound, Single Component Butyl Rubber Based Solvent Release Type (for Buildings and other Types of Construction).

##### 1.3 SUBMITTALS

- A. Section 013300 – Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Product chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
  - 1. Warranty: Submit manufacturer warranty with forms completed in United States Postal Service name and registered with manufacturer.

##### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing Work of this Section with minimum 5 years documented experience.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Deliver Products in manufacturer's original unopened containers or packages with labels intact, identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions, where applicable.
- C. Store and handle materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

## 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements: Install sealant during manufacturer's recommended temperature ranges and weather conditions for application and cure. Consult manufacturer when sealant cannot be applied during recommended conditions.

## 1.7 WARRANTY

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Warranty:
  - 1. Submit written warranty signed by sealant manufacturer agreeing to replace sealants and accessories which fail because of loss of cohesion or adhesion, or which do not cure.
  - 2. Warranty Period: 5 years or longer per the manufacturers' standard warranties.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated into the work include the following:
  - 1. Bostik, Inc, Huntingdon Valley, PA, (800) 523-2678, (125) 674-5600.
  - 2. Dow Corning, Midland, MI (517) 496-4000.
  - 3. GE Silicones, Waterford, NY (518) 233-3330.
  - 4. Mameco International, Cleveland, OH, (800) 321-6412, (216) 752-4400.
  - 5. W.R. Meadows, Inc, Elgin, IL (800) 342-5976, (847) 683-4500.
  - 6. Nomaco, Inc., Zebulon, NC, (919) 269-6500.
  - 7. Pecora Corporation, Harleysville, PA, (800) 523-6688, (215) 723-6051.
  - 8. Sika Corporation, Lyndhurst, NJ, (800) 933-7452, (201) 933-8800.
  - 9. Sonneborn Building Products Div. ChemRex, Inc., Shakopee, MN (800) 243-6739, (612) 496-6000.
  - 10. Tremco, Beachwood, OH, (800) 852-3821, (216) 292-5000.
  - 11. USG Corp., Chicago, IL (800) 874-4968, (312) 606-4000.
  - 12. Sherwin-Williams Co. (The), Cleveland, OH (800) 321-8194

### 2.2 BUILDING SEALANTS (See Sealant Schedule at the end of this Section for specific use of sealants.)

- A. Urethanes:
  - 1. Type 1: Two-Part Urethane: Self-Leveling, ASTM C920, Type M, Grade P, Class 25.
    - a. Chem-Calk CC-550, by Bostik.
    - b. Vulkem 245, by Mameco.

- c. Vulkem 255, Wide-Joint, by Mameco.
- d. NR-200 Urethane, by Pecora Corporation.
- e. Loxon 2K SL Multi-Component Polyurethane Sealant, by Sherwin-Williams.
- 2. Type 2: Two-Part Urethane: Non-Sag, ASTM C920, Type M, Grade NS, Class 25.
  - a. Chem-Calk 500, by Bostik.
  - b. Vulkem 227, by Mameco.
  - c. Sonolastic NP 2, by Sonneborn Building Products, ChemRex Inc.
  - d. Loxon 2K NS Multi-Component Polyurethane Sealant, by Sherwin-Williams.
- 3. Type 3: One-Part Urethane: Self-Leveling, ASTM C920, Type S, Grade P, Class 25.
  - a. Vulkem 45, by Mameco.
  - b. Urethane NR-201, by Pecora Corporation.
  - c. Sonolastic SL1, by Sonneborn Building Products, ChemRex Inc.
  - d. Sikaflex 1C-SL by Sika.
  - e. Loxon 1K SL Polyurethane Sealant, by Sherwin-Williams.
- 4. Type 4: One-Part Urethane: Non-Sag, ASTM C920, Type S, Grade NS, Class 25.
  - a. Chem-Calk 900, by Bostik.
  - b. Vulkem 116, by Mameco.
  - c. Sonolastic NP I, by Sonneborn Building Products, ChemRex Inc.
  - d. Loxon 1K Smooth Polyurethane Sealant, by Sherwin-Williams.

B. Silicones:

- 1. Type 1: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 50.
  - a. 795 Silicone Building Sealant, by Dow Corning.
  - b. 864 Architectural Silicone Sealant, by Pecora Corporation.
  - c. White Lightning Silicone Ultra Sealant, by Sherwin-Williams.
- 2. Type 2: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 25.
  - a. 999-A Silicone Building & Glazing Sealant, Dow Corning.
  - b. Construction 1200 Sealant, General Electric Company.
- 3. Type 3: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 25. Vertical Surfaces Only.
  - a. Construction 1200 Sealant, General Electric Company.
  - b. 999-A, Dow Corning.
  - c. 860 Glaziers and Contractors Silicone Sealant, by Pecora Corporation. (colors only)
- 4. Type 4: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 25 or 50.
  - a. 786 Mildew Resistant Silicone Sealant, Dow Corning.
  - b. SCS 1700 Sanitary Sealant, General Electric.
  - c. 898 Silicone Sanitary Sealant, Pecora Corporation.

C. Acrylics, Latex:

- 1. Type 1: One-Part Acrylic Latex, Non-Sag, ASTM-C-834-76.
  - a. Chem-Calk 600, by Bostik.
  - b. LC-130, by MACCO Adhesives, The Glidden Company.
  - c. Easa-ply ALS, by W. R. Meadows, Inc.
  - d. AC-20+Silicone Acrylic Latex, by Pecora Corporation.
  - e. Sonolac, Sonneborn Building Products, ChemRex Inc
  - f. 950A Siliconized Acrylic Latex Caulk, by Sherwin-Williams.

D. Acoustical Sealants:

- 1. Type 1: AC-20 FTR Acoustical and Insulation Sealant, by Pecora Corporation.
- 2. Type 2: 60+ Unicrylic, by Pecora Corporation.
- 3. Type 3: Sheetrock Acoustical Sealant, by United States Gypsum.
- 4. Power House Siliconized Latex Caulk, by Sherwin-Williams

E. Butyls:

- 1. Type 1: One-Part Butyl, Non-Sag, FS TT-S-1657.
  - a. Chem-Calk 300, by Bostik.
  - b. BC-158 Butyl Rubber, by Pecora Corporation. (ASTM C1085)
  - c. White Lightning Butyl Rubber Caulk, by Sherwin-Williams. (ASTM C1311)



- F. Preformed Compressible & Non-Compressible Fillers:
  - 1. Type 1: Backer Rod - Closed cell polyethylene foam:
    - a. HBR Backer Rod, by Nomaco.
    - b. #92 Greenrod, by Nomaco.
    - c. Sonofoam Closed-Cell Backer Rod, Sonneborn Building Products, ChemRex Inc.
  - 2. Type 2: Backer Rod - Open cell polyurethane foam:
    - a. Denver Foam, by Backer Rod Mfg Inc.
    - b. Foam Pack II, by Nomaco.
  - 3. Type 3: Neoprene compression seals:
    - a. WE, WF, and WG Series, by Watson Bowman & Acme Corp.
    - b. Will-Seal 150 Precompressed Expanding Foam Sealants, by Will-Seal, a Division of Illbruck.
  - 4. Type 4: Butyl Rod: Kirkhill Rubber Co. (714)529-4901.
- G. Bond Breaker Tape: Polyethylene tape of plastic as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate of joint filler must be avoided for proper performance of sealant

## 2.3 PAVING SEALANTS

- A. Type 1: Two-Part Urethane: Self-Leveling, ASTM C920, Type M, Grade P, Class 25.
  - 1. Vulkem 202, by Mameco. (Jet Fuel Resistant) (FS SS-S-200D, Type H only)
  - 2. NR-300 Urexpam, by Pecora Corporation. (FS SS-S-200E)
  - 3. Loxon 2K SL Polyurethane Sealant, by Sherwin-Williams.
- B. Type 2: One-Part Urethane: Self-Leveling, ASTM C920, Type S, Grade P, Class 25.
  - 1. Sonomeric 1 Sealant, by Sonneborn Building Products, ChemRex Inc. (FS SS-S-200E)
  - 2. Vulkem 45, by Mameco.
  - 3. Loxon 1K SL Polyurethane Sealant, by Sherwin-Williams

## 2.4 COLORS

- A. Generally, use sealant colors matching color of material joint is located in.
- B. Where a joint occurs between two materials of differing colors and Contractor cannot determine which material to match, contact Contracting Officer for selection.

## 2.5 ACCESSORIES

- A. Joint Cleaner: Provide type of joint cleaning compound recommended by sealant manufacturer for joint surfaces to be cleaned.
- B. Primer: As recommended by sealant manufacturer.
- C. Masking tape and similar accessories to protect surfaces from damage.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.

- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify that joint widths are in conformance with sealant manufacturer allowable limits.
  - 2. Verify that contaminants capable of interfering with adhesion have been cleaned from joint and joint properly prepared.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 PREPARATION

- A. Prepare and size joints in accordance with manufacturer's instructions. Clean substrates of dirt, laitance, dust, or mortar using solvent, abrasion, or sandblasting as recommended by manufacturer. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Verify that joint backing and release tapes are compatible with sealant. Verify sealant is suitable for substrate. Verify that sealant is paintable if painted finish is indicated.
- C. Protect materials surrounding work of this Section from damage or disfiguration.

### 3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's published instructions.
- B. Prime or seal joint surfaces where recommended by sealant manufacturer. Do not allow primer or sealer to spill or migrate onto adjoining surfaces.
- C. Install backer rod and bond breaker tape where required by manufacturer.
- D. Install preformed compressible and non-compressible fillers in accordance with manufacturer's published instructions.
- E. Install sealants to depths recommended by sealant manufacturer in uniform, continuous ribbons free of air pockets, foreign embedded matter, ridges, and sags, "wetting" joint bond surfaces equally on both sides.
- F. Tool joints concave unless shown otherwise. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form slight cove so that joint will not trap moisture and foreign matter. Dry tool joints. Do not use soap, water, or solvent to tool joints.
- G. Epoxy Floor Joint Sealant: Install sealant at floor construction and control joints in accordance with manufacturer's published instructions and initially under manufacturer's supervision.

### 3.4 CURING

- A. Cure sealants in compliance with manufacturer's published instructions.

### 3.5 CLEANING

- A. Remove excess and spillage of sealants promptly as the work progresses, using materials and methods as recommended by sealant and substrate manufacturers. Clean adjoining surfaces to eliminate evidence of spillage without damage to adjoining surfaces or finishes.

### 3.6 SEALANT SCHEDULE

#### A. Exterior Joints:

1. Perimeters of exterior openings where frames and other penetrations meet exterior facade of building: precast concrete, brick, CMU, polymer reinforced concrete.
  - a. Sealant Urethane Type 2
  - b. Sealant Silicone Type 1 (for prefinished materials only)
2. Expansion and control joints in exterior surfaces of cast-in-place concrete walls, precast architectural wall panels.
  - a. Sealant Urethane Type 2
  - b. Sealant Urethane Type 4
  - c. Preformed Compressible & Non-Compressible Filler Type 1
3. Expansion and control joints in exterior surfaces of unit masonry walls and polymer reinforced concrete, including at metal panels.
  - a. Sealant Urethane Type 2
4. Coping joints, coping-to-facade joints, cornice and wash, or horizontal surface joints not subject to foot or vehicular traffic.
  - a. Sealant Urethane Type 2
  - b. Sealant Urethane Type 4
  - c. Sealant Silicone Type 1 (for prefinished materials only)
5. Exterior joints in horizontal wearing and non-wearing surfaces.
  - a. Sealant No. Urethane Type 1
  - b. Sealant No. Urethane Type 3
  - c. Preformed Compressible & Non-Compressible Filler Type 1
6. Paving joints and curbs.
  - a. Sealant Urethane Type 4
  - b. Paving Sealant Type 2
7. Setting bed for threshold and saddles.
  - a. Sealant Acoustical Type 1
8. Painted metal lap or flashing joints.
  - a. Sealant Silicone Type 1

#### B. Interior Joints:

1. Seal interior perimeters of exterior openings.
2. Expansion and control joints on interior of exterior cast-in-place concrete walls.
3. Expansion and control joints on interior of exterior precast, architectural wall panels.
4. Expansion and control joints on interior of exterior masonry walls.
5. Perimeters of interior hollow metal and aluminum frames.
6. Interior masonry vertical control joints and intersecting masonry walls; CMU-to-CMU, CMU-to-concrete.
7. Joints at intersection of exterior masonry walls and interior gypsum board partitions.
8. For all of the above interior joints:
  - a. Sealant Urethane Type 2
  - b. Sealant Urethane Type 4
  - c. Sealant Silicone Type 1 (for prefinished materials only)
9. Exposed interior control joints in drywall and concealed joints.
  - a. Sealant Acrylic, Latex, Type 1
  - b. Sealant Acoustical Type 1
  - c. Sealant Acoustical Type 3
  - d. Sealant Butyl Type 1
10. Joints of underside of precast beams or planks.
  - a. Sealant Urethane Type 2

- b. Sealant Urethane Type 4
- 11. Joints at tops of non-load bearing masonry walls at underside of cast-in-place concrete.
  - a. Sealant Urethane Type 2
  - b. Sealant Urethane Type 4
- 12. Perimeter of bath fixtures: sinks, tubs, urinals, waterclosets, basins, vanities, etc.
  - a. Sealant Silicone Type 4
- 13. Interior expansion and control joints in floor surfaces exposed to foot traffic.
  - a. Sealant Urethane Type 2
  - b. Sealant Urethane Type 4
  - c. Preformed Compressible & Non-Compressible Filler Type 1
- 14. Interior saw-cut contraction joints in exposed concrete floors exposed to forklift traffic.
  - a. Paving Sealant Type 1
- 15. Interior non-moving joints, including control, contraction, or construction joints, in interior floor slabs exposed to heavy duty traffic.
  - a. Paving Sealant Type 1
- 16. Painted metal lap joints.
  - a. Sealant Silicone Type 1

C. Glazing:

- 1. Structural Glazing.
  - a. Sealant Silicone Type 2
  - b. Sealant Silicone Type 3
- 2. General Purpose Glazing.
  - a. Sealant Silicone Type 3
- 3. End Damming.
  - a. Sealant Butyl Type 1

END OF SECTION

USPS CSF Specification

SECTION 081100  
METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Steel doors and frames.
  - 2. Steel door louvers.
  - 3. Steel frames for wood doors.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 087100 - Door Hardware: Hardware coordination.
  - 2. Section 099100 - Painting: Field painting and finishing of doors and frames.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM A 152 - Methods for Fire Tests of Door Assemblies.
  - 2. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 1996.
- B. Door Hardware Institute (DHI):
  - 1. DHI - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
  - 2. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware.
- C. Steel Door Institute (SDI):
  - 1. SDI-100 - Recommended Specifications Standard Steel Doors and Frames.
  - 2. SDI-105 - Recommended Erection Instructions for Steel Frames.
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 80 - Fire Doors and Windows.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Indicate door materials, gauges, configurations, and location of cut-outs hardware reinforcement, and finish.
    - a. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for louvers.

1.4 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum 5 years documented experience.
  - 2. Installer: Company specializing in performing work of this Section with minimum 5 years documented experience.

## 1.5 DELIVERY, STORAGE AND PROTECTION

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Protect doors and frames with resilient packaging.
- C. Break seal on-site to permit ventilation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering items which may be incorporated in the Work include the following:
  - 1. Amweld Building Products, Incorporated, Garrettsville, OH (330) 527-4385, (800) 248-6116.
  - 2. Ceco Door Products, Brentwood, TN (615) 661-5030.
  - 3. Curries Company, Mason City, IA (515) 423-1334.
  - 4. Republic Builders Products, McKenzie, TN (800) 733-3667.
  - 5. Steelcraft, Cincinnati, OH (513) 745-6400.
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 MATERIALS

- A. Exterior Doors: SDI-100, Level II - Heavy-Duty - 1-3/4 inch, Model 1 - Full Flush Design, 18 gage cold-rolled steel; galvanized in accordance with ASTM A 653.
- B. Interior Doors: SDI-100, Level II - Heavy-Duty - 1-3/4 inch, Model 1 - Full Flush Design, 18 gage cold-rolled steel.
- C. Exterior Frames: 16 gage, cold-rolled steel, mitered and welded; galvanized in accordance with ASTM A 653.
- D. Interior Frames: 16 gage, cold-rolled steel, mitered and welded, 2 inch profile, for installation in a metal or wood stud security partition.
- E. Interior Frames: 16 gage, cold-rolled steel, mitered and welded, 2 inch profile, for installation in a metal or wood stud and gypsum board partition.

### 2.3 CORE CONSTRUCTION

- A. Provide one of the following core construction;
  - 1. Interior Doors: Kraft Honeycomb, Phenolic treated.
  - 2. Exterior Doors:

- a. Polyurethane: Core foamed-in-place or laminated. 20 psi strength, 1.8 pcf density; 1/2 inch maximum voids in any direction. Strength of bond between core and steel face sheet shall exceed strength of core so delamination will not occur during operating conditions.
- b. Polystyrene: Rigid core of polystyrene foam board, 1500 psf compressive strength, 18 psi shear strength. Strength of bond between core and steel face sheet shall exceed strength of core so that delamination will not occur under operating conditions.
- c. Vertical Steel Stiffeners: 22 gage vertical steel stiffeners, spaced 6 inches apart and spot welded to face sheets at 6 inches on center. Insulate spaces between stiffeners with loose fill insulation full height of door.

## 2.4 ACCESSORIES

- A. Rubber Silencers: Resilient rubber.
- B. Louvers:
  - 1. Material and Finish: Roll formed 20 gauge steel with wipe coat of zinc.
  - 2. Blade: Inverted Y blade, sight proof.
- C. Top Filler Cap on exterior doors: Install cap, weld, grind, fill and finish smooth.

## 2.5 PROTECTIVE COATINGS

- A. Bituminous Coating: Fibered asphalt emulsion.
- B. Primer: Exposed surfaces shall be cleaned, treated with Bonderite chemical and given one baked-on shop coat of grey rust inhibiting primer.

## 2.6 FABRICATION

- A. Fabricate units rigid, neat, and free from warp or buckle. Fabricate KD or welded as specified. Weld exposed joints continuously; grind, dress, and make smooth, flush and invisible.
- B. Reinforce units to receive surface applied finish hardware.
- C. Prepare frame for silencers. Provide three single rubber silencers for single doors and two single silencers on frame head at double doors without mullions.
- D. Primer: Air dried.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION

- A. Install frames in accordance with SDI-105.
- B. Install doors in accordance with DHI.
- C. Install doors in accordance with manufacturer's published instructions, of size, and at locations indicated.
- D. Coordinate with adjacent wall construction for anchor placement.
- E. Field paint doors and frames as specified in Section 099100.
- F. The frame is to be mounted to the studding in such a manner to prevent a spreading of the frame from the studs of less than 1/2 inch.

### 3.3 CONSTRUCTION

- A. Interface with Other Work:
  - 1. Coordinate frame installation with size, location, and installation.
  - 2. Coordinate with door opening construction, door frame, and door hardware installation.
- B. Site Tolerances:
  - 1. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

### 3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspection.
- B. Inspect metal door and frame installation, alignment, attachment to structure, and operation.

### 3.5 ADJUSTING AND CLEANING

- A. Adjust hardware for smooth and balanced door movement.
- B. Section 017300 - Execution: Cleaning installed Work.

END OF SECTION

USPS CSF Specification



## SECTION 083313

### RAPID ROLL-UP DOORS

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Interior and Exterior Rapid roll-up doors and operators.

##### 1.2 SUBMITTALS

- A. Shop Drawings: Required.
- B. Product Data: Required.
- C. Samples: Required
- D. Certificates of Quality Assurance: Required

##### 1.3 QUALITY ASSURANCE

- A. Compliance with local governing codes.
- B. Compliance with ASCE-7 for wind loading requirements.

#### PART 2 – PRODUCTS

##### 2.1 RAPID ROLL-UP DOORS

- A. Approved Manufacturers
  - 1. Rytec
  - 2. Marathon
  - 3. Horman
  - 4. Albany
  - 5. Dynaco
  - 6. Rite-Hite
- B. Interior Doors – Fabric
  - 1. Basis of Design
    - a. Rytec: Model PredaDoor PD5500NXT.
  - 2. Materials:
    - a. Material: Minimum 71 oz., 2-ply monofilament curtain, color blue. Material to be laterally stiff and vertically flexible for enhanced wind/pressure resistance. Curtain sections connected by two integral extruded panel connecting ribs. Door curtain to have modular design to allow for easy curtain section replacement.
    - b. Usage: Door and all components to be designed for heavy-duty cycles and operation.
    - c. Bottom Bar: Rigid extruded aluminum with breakaway feature allowing release in either direction upon impact or immediate reset without the use of tools. Wireless with control-reliable 2-way communication, frequency-hopping technology and minimum 3-year battery life. Dual cut-off switches shut off motor when bottom bar is impacted.

- d. Motor: Variable-speed, AC drive, 42-50 inches per second opening and 21 inches per second closing. Adjustable, independent opening and closing speeds.
- e. Controls: Programmable self-diagnostic controller with two-line, 32-character external display for status messaging and diagnostics housed in a UL listed NEMA 4x-rated enclosure.
- f. Activation Devices: Induction loop and manual push button with time-delay closing.
- g. Safety: Full width pneumatic safety reversing edge and (2) two thru-beam photo eyes.
- h. Travel Limits: Absolute rotary encoder to regulate door travel limits. Limits adjusted, without tools at control panel, not motor. Control software to incorporate a self-adjusting limit feature where the software monitors the door position and adjusts the limits, as required, to maintain a proper seal.
- i. Vision Panel: Full width of door, minimum 31 inches high, replaceable.
- j. Side Frames: Fully bolt-together, anodized aluminum construction.
- k. Weatherseal: Dual, full-height weatherseals to seal against both sides of door panel long with full-width, header seal and full-width seal on bottom bar.
- l. Warranty: 2-year warranty on door with an extended 5-year warranty on door curtain.

C. Exterior Doors – Fabric

- 1. Basis of Design:
  - a. Rytec: Model Fast-Seal FS 1000.
- 2. Materials:
  - a. Material: Minimum 86 oz., 3-ply monofilament curtain, color blue. Material to be laterally stiff and vertically flexible for enhanced wind/pressure resistance.
  - b. Usage: Door and all components to be designed for heavy-duty cycles and operation.
  - c. Bottom Bar: Rigid extruded aluminum with breakaway feature allowing release in either direction upon impact and immediate reset without the use of tools. Wireless with control-reliable 2-way communication, frequency-hopping technology and minimum 3-year battery life. Dual cut-off switches shut off motor when bottom bar is impacted.
  - d. Counterbalance: Custom-Sized, dual counter-weight with life-time warranty on counter-weight system.
  - e. Curtain Tension: Must be separate from counterbalance system and maintain constant tension on door curtain.
  - f. Motor: Variable-speed, AC drive, 50 inches per second opening and closing and 21 inches per second closing. Adjustable, independent opening and closing speeds.
  - g. Controls: Programmable self-diagnostic controller with two-line, 32-character external display for status messaging and diagnostics.
  - h. Activation Devices: Motion sensors, one on each side with time-delay closing.
  - i. Safety: Full width pneumatic safety reversing edge and (2) two thru-beam photo eyes.
  - j. Travel Limits: Absolute rotary encoder to regulate door travel limits. Limits adjusted, without tools at control panel, not motor. Control software to incorporate a self-adjusting limit feature where the software monitors the door position and adjusts the limits, as required, to maintain a proper seal.
  - k. Windbars: Front and/or rear windbars according to manufacturer's recommendation.
  - l. Vision Panel: Minimum 3 replaceable panels – 17 x 17 inch each.
  - m. Side Frames: 11-gauge reinforced side frames with front and rear wind bar guides, 14-gauge hinges access covers.
  - n. Weatherseals: Dual, full-height weatherseals to seal against both sides of door panel long with full-width, header seal and full-width seal on bottom bar.
  - o. Warranty: 1-year warranty on door with an extended 5-year warranty on door curtain.

D. Exterior Doors – Rigid

- 1. Basis of Design:
  - a. Rytec Corporation Spiral Door
- 2. Materials:
  - a. Door Panel: Double-walled, aluminum slats are 6 inches high by 1 3/16 inches thick. Integral rubber weatherseal between each of the panels, with 3.25" high window slats. Door slats are connected by hinge system to provide additional rigidity and security to

- door panel. Door curtain does not require a tensioning system for additional wind/pressure resistance. Doors which require the use of a tensioning system for additional wind/pressure resistance will not be accepted.
- b. Side Frames: Powder coated steel side frames with full height weather seal on both sides to seal against door panel. "Intelligent" Advanced3 Light Curtain System mounted directly in door line (to 6'0" above finished floor). Doors using an external coil cord will not be accepted.
  - c. Bottom Bar: Extruded aluminum bottom bar with electric, reversing edge that reverses the door upon contacting an object.
  - d. Counterbalance: Up to six extension springs in each side column, depending on the size of the door. Springs assist the motor in opening the door. Mechanical release lever on side column allows door to be easily opened in the event of a power failure. Doors using torsion springs for counterbalance or doors with springs located within a barrel will not be accepted.
    1. Doors utilizing direct drive with springless system accepted.
  - e. Drive system: Minimum 2 HP motor with variable speed AC drive which allows for soft acceleration and braking. Doors using a motor with a clutch or pump will not be accepted.
  - f. Travel Speed: Opens at up to 60 inches per second and closes at 24 inches per second.
  - g. Electrical Controls:
    1. Controller housed in a UL/cUL Listed NEMA 4X-rated enclosure with factory set parameters.
    2. Parameter changes and all door configurations can be made from the face of the control box, no exposure to high voltage. Control panels that require opening of the control box and reaching inside to make parameter changes will not be accepted.
    3. Controls include a variable speed AC drive system capable of infinitely variable speed control in both directions.
    4. Programmable inputs and outputs accommodate special control applications (traffic lights, horns, actuation devices, timing sequences, etc.) without the need for additional electrical components.
    5. Self-diagnostic scrolling two-line vacuum fluorescent display provides expanded informational messages for straightforward installation, control adjustments and error reporting.
    6. All errors have a time and date stamp for reference.
  - h. Door to use rotary absolute encoder to regulate door travel limits. Limits to be self adjusting, without the use of tools, from floor level at the control panel. Doors using mechanical limits switches or doors that require tools to set the limits will not be accepted.
  - i. Door Track: Spiral rollup design features no metal-to-metal contact which results in ultraquiet, low maintenance operation and eliminates wear on panel slats. Doors that roll up on a barrel or whose track design allows metal-to-metal contact will not be accepted.
  - j. Wind load: Door testing indicates the door is capable of withstanding winds up to 127 mph (20 psf).
  - k. All components factory finished.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine wall and overhead areas, including opening framing and blocking, with Installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work of this Section.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.
- B. Fasten vertical track assembly to framing at not less than 24 inches o.c. Hang horizontal track from structural overhead framing with angle or channel hangers welded and bolt fastened in place. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

### 3.3 ADJUSTING

- A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

### 3.4 DEMONSTRATION

- A. Startup Services: Engage a factory-authorized service representative to perform startup services and to train Owner's maintenance personnel as specified below:
  1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
  3. Review data in the maintenance manuals. Refer to Division 1 Section "Contract Closeout."
  4. Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION

USPS MPF Specification

## SECTION 083800

### TRAFFIC DOORS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Double action impact resistant traffic doors, security type.
  - 2. Door hardware.
  - 3. Security features.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Provide products complete with accessories, trim, finish, safety guards, and other pertinent devices and details needed for a complete installation and intended use.
- D. Related Sections:
  - 1. Section 055000 - Metal Fabrications: Steel door frames for traffic doors.

##### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Indicate door materials, thickness, configuration, and hardware.
  - 2. Shop Drawings:
    - a. Indicate dimensions, details of construction, and installation.
    - b. Indicate relationship to adjoining related Work where cutting, fitting, reinforcement, and anchorage is required for complete installation.
- B. Section 017704 – Closeout Procedures and Training: Procedures for closeout submittals.
  - 1. Operating and Maintenance Data: Operating and maintenance instruction and parts lists.
  - 2. Submit written special warranty with forms completed in United States Postal Service name and registered with manufacturer as specified in this section.

##### 1.4 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Deliver product in manufacturer's original unopened packages with labels legible and intact.
- C. Labels shall identify manufacturer, brand name, model size, finish, and location of installation.
- D. Store double action doors and accessories in unopened packages in protected dry area to prevent damage from environmental and construction operations.
- E. Handle double action doors with care to prevent damage.

## 1.6 WARRANTY

- A. Comply with Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Manufacturer warranty to cover all material and labor required to repair or replace doors and door components for a period of two years from time of acceptance by USPS, within a guaranteed maximum repair response time of ten calendar days.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. This Product must be manufactured by a USPS Direct Vendor and is subject to a USPS price and requirements purchasing agreement. The following vendor must be used:
  - 1. Chase Industries/Senneca Holdings, 10021 Commerce Park Dr., Cincinnati, OH 45246, (800) 543-4455, ext. 3477, quotes-orders@senneca.com.
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Not Permitted.

### 2.2 TRAFFIC DOORS

- A. Model: Chase Industries.
  - 1. Standard Sizes: Durulite Series 200 Security Doors.
  - 2. Custom Sizes: Durulite Series ME-200 Security Doors.
- B. Color: Selected by Contracting Officer from manufacturer's standard colors.
- C. Door Body:
  - 1. Per manufacturer's USPS approved construction.
  - 2. Panel skin rate of burning, ASTM D635: "HB" (horizontal burning), no combustion.
  - 3. Panel skin flame spread index, ASTM E84: 275 maximum.
- D. Hardware: The upper pivot shall consist of a V-cam capable of carrying a door weighing 200 pounds. Lift shall be 1-3/8 inches with gravity self-closing action. Door shall be adjustable back and forth and/or up and down.
- E. Gaskets: All gasket materials shall be factory applied and shall include wings to prevent accumulation of dirt. Gaskets shall be on leading edge, back and bottom of each door panel.

- F. Top and Hinge Seal Covers: Top seal shall be made of block reinforced nylon, with black anodized aluminum metal. Stainless steel screws shall be used for fastening to frame. Top and bottom hinge seal covers shall be field installed.
- G. Viewing Area:
  - 1. Per manufacturer's USPS approved construction.
- H. Fasteners: All fasteners and washers, including jamb fasteners shall be made of stainless steel.
- I. Black Spring Polyethylene Bumper/Kick Plate.
  - 1. At Carrier Vestibule: 38-inch-high bumpers on both sides of doors with no kick plate.
  - 2. At Mail Vestibule: 38-inch-high bumpers on both sides of doors with no kickplate.
- J. Steel Door Frames: Specified in Section 055000.
- K. Directional Signs. USPS standard design:
  - 1. Pictograph for enter. Apply to entry side of panels.
  - 2. Pictograph and "NO EXIT". Apply opposite to entry side of panels for doors providing entry to building.
  - 3. Pictograph and "NO ENTRY". Apply opposite to entry side of panels for doors providing exit from building.

## 2.3 SECURITY FEATURES

- A. In addition to the items specified above, the following features shall be included in the door units:
  - 1. Lower hinge guard.
  - 2. Cane bolts, minimum 5/8-inch round steel, 12 inches long from tip to elbow (upper) and 36 inches long from tip to elbow (lower).
  - 3. 2-inch chain hole with grommet.
  - 4. Dirt free retainer sleeves for each lower cane bolt, with a depth of at least 3 inches.
  - 5. Double glazed polycarbonate security windows with three 1 inch x 1/4 inch vertical steel bars. The vertical bars extend from the top of the door to within 33 inches of the bottom of the door panel, with a maximum horizontal spacing of 7 inches.

## 2.4 DOOR STOPS

- A. Overhead door stops, header mount with tabs and contact pads.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
  - 1. Verify that openings are prepared with headers level, jambs plumb, floor level, without projections, and are correctly dimensioned to receive double action doors.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION

- A. Install door unit assembly to manufacturer's published instructions and final shop drawings.
- B. Fit and align door assembly level and plumb.
- C. Use anchorage devices to securely fasten door assembly to door frame construction without distortion or imposed stresses.

### 3.3 ADJUSTING

- A. Adjust door assembly to provide smooth operation from closed to fully open position.

### 3.4 CLEANING

- A. Section 017300 - Execution: Cleaning installed Work.
- B. Remove protective material from pre-finished surfaces.
- C. Remove labels and visible markings.
- D. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Wipe surfaces clean.

END OF SECTION

USPS MPF Specification



## SECTION 087100

### DOOR HARDWARE

#### GENERAL

##### 1.1 SUMMARY

###### A Section Includes:

1. Finish Hardware items which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.
2. Hinges.
3. Locks and latches.
4. Operating trim.
5. Accessories for pairs of doors and exit devices.
6. Closing devices.
7. Door controls.
8. Stops and holders.
9. Miscellaneous hardware.

###### B Related Sections:

1. Section 083613 - Sectional Doors.
2. Section 084113 - Aluminum-Framed Entrances and Storefronts: Hardware for same, and coordination.
3. Section 084229 - Automatic Entrances.
4. Section 016000 - Product Requirements.
5. Section 281304 – Enterprise Physical Access Control System

##### 1.2 REFERENCES

###### A. American National Standards Institute (ANSI):

1. ANSI A156.3 - National Standard for Exit devices.
2. ANSI A156.4 - National Standard for Door Controls - Closers.
3. ANSI A156.6 - National Standard for Architectural Door Trim.
4. ANSI A156.13 - National Standard for Mortise Locks & Latches.

###### B. National Fire Protection Association (NFPA):

1. NFPA 80 - Fire Doors and Windows.
2. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
3. NFPA 252 - Fire Tests of Door Assemblies.

###### C. Underwriters Laboratories (UL):

1. UL 10B - Fire Tests of Door Assemblies.
2. UL 305 - Panic Hardware.

##### 1.3 SUBMITTALS

- ###### A. Section 013300 - Submittal Procedures: Procedures for submittals.

- B. Product Data: Submit manufacturers' technical product data for each item of hardware. Include whatever information may be necessary to show compliance with requirements and include instructions for installation and for maintenance of operating parts and finishes.
- C. Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames, Enterprise Physical Access Control System, and related work to ensure proper size, thickness, hand, function, door control, and finish of hardware.
  - 1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
    - a. Type, style, function, size and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
    - f. Mounting locations for hardware.
    - g. Door and frame sizes and materials.
    - h. Keying information.
  - 2. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.
- D. Samples: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, as selected by the USPS Project Manager, finished as required, and tagged with full description for coordination with schedule.
  - 1. Samples will be returned to the supplier. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.
- E. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.
- F. Written Report: Before project acceptance and final inspection, the General Contractor shall provide a detailed written report shall be made to the USPS Project Manager covering application and condition of the Finish Hardware. A report shall be made for each door indicating what was installed, that it matches what was indicated in the door hardware schedule, that it was installed correctly and that it functions properly. The report shall be submitted to the CO with a copy to the COR (the project manager). The A/E or the project manager may choose to verify the report by verifying every door or a random number of them.

#### 1.4 QUALITY ASSURANCE

- A. Perform work in accordance with the following requirements:
  - 1. ANSI A117.1
  - 2. NFPA 101.
  - 3. NFPA 80.
  - 4. NFPA 252.
  - 5. UL 10B.
  - 6. UL 305.
- B. Regulatory Requirements:
  - 1. Conform to applicable code for requirements applicable to fire rated doors and frames.

2. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., and acceptable to the public authority as suitable for the purpose specified and indicated.
  3. Conform to United States Postal Service "Standards for Facility Accessibility by the Physically Handicapped" Handbook RE-4 for mounting heights and locations of accessories.
- C. Manufacturer: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
- D. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware to similar projects for a period of not less than 2 years, and who employs an experienced architectural hardware consultant (AHC) who is available, at reasonable times during the course of the work, for consultation about projects' hardware requirements.
- E. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Within each Article in Part 2 hardware products from a few manufacturers are specified to establish a standard of quality and minimum functional requirements.
- B. All items of a particular hardware category i.e. locksets, closers, hinges shall be of the same manufacturer.
- C. Hardware Manufacturers:
- 1., Adams Rite / ASSA ABLOY, Phoenix, AZ, (800) 872-3267
  - 2., Alarm Lock Systems, Amityville, NY, (800) 252-56254
  - 3.,
  - 4., Best Access Systems, Indianapolis, IN, (800) 311-17055
  5. Corbin Russwin, Berlin, CT, (800) 543-3658
  - 6., Detex Corporation, New Brannfels, TX, (800) 729-3839
  - 7., Door Controls International, Dexter, MI, (800) 742-3634
  - 8., Folger Adam Company, Lemont, IL, (800) 260-9001
  - 9., Glynn Johnson, Indianapolis, IN, (877) 613-8766
  - 10., Hager Companies, St. Louis, MO, (800) 255-3590
  - 11., Hiawatha, Inc., Bloomington, MN, (800) 777-1686
  - 12., H. B. Ives, Wallingford, CT, (888) 371-7331
  - 13., Knape & Vogt Manufacturing Co., Grand Rapids, MI, (800) 253-1561
  - 14., LCN Closers, Princeton, IL, (800) 526-2400
  - 15., McKinney Hinge, Scranton, PA, (800) 346-7707
  - 16., National Guard Products, Incorporated, Memphis, TN, (800) 647-7874
  - 17., Norton, Charlotte, NC, (800) 393-1097
  - 18., Pemko, Ventura, CA, (800) 824-3018
  - 19., Precision Hardware, Romulus, MI, (317) 849-2250
  - 20., Reese Enterprises, Incorporated, Rosemount, MN, (800) 328-0953
  - 21., Rixson-Firemark, Franklin Park, IL, (866) 474-9766
  - 22., Rockwood Manufacturing, Rockwood, PA, (800) 458-2424
  - 23., Sargent, New Haven, CT, (800) 727-5477
  - 24., Sargent & Greenleaf, Nicholasville, KY, (800) 826-7652
  - 25., Schlage, Colorado Springs, CO, (800) 847-1864

- 26., Securitech Group Incorporated, Maspeth, NY, (800) 622-5625
- 27., Simplex Access Controls, (800) 746-7539
- 28., Soss, Pioneer, OH, (800) 922-6957
- 29., Stanley, New Britain, CT, (877) 334-6791
- 30., Trimco, Los Angeles, CA, (323) 262-4191
- 31., Von Duprin, Indianapolis, IN, (317) 613-8302
- 32., Wooster Products Incorporated, Wooster, OH, (800) 321-4936
- 33., Yale, Charlotte, NC, (800) 438-1951
- 34., Zero International, Bronx, NY, (800) 635-5335

- D. Section 016000 - Product Requirements: Unless noted otherwise, substitution of specified products with equivalent products from the above approved manufacturers is permitted in accordance with Product Options and Substitutions in Section 016000.

## 2.2 HINGES

- A. Subject to compliance with requirements, provide hinges of one of the following manufacturers and as specified below:
  - 1. Hager.
  - 2. McKinney.
  - 3. Stanley.
  - 4. Soss.
  
- B. Material:
  - 1. For interior doors, provide full mortise type steel hinges with steel pins; non-rising for non-security exposure, flat button with matching plugs.
  - 2. For exterior doors, provide full mortise type stainless steel hinges with stainless steel pins; non-removable, flat button with matching plugs.
  - 3. Ball bearing Type: Swaged, inner leaf beveled, square corners.
  
- C. Hinges/pivots by types:
  - 1. Type H-1: Medium weight door, average frequency, steel.
    - a. Hinge ..... FBB179..... 4-1/2 x 4-1/2 .....652 .....Stanley
    - b. Hinge ..... BB1279..... 4-1/2 x 4-1/2 .....652 .....Hager
    - c. Hinge ..... TA2714 ..... 4-1/2 x 4-1/2 .....652 .....McKinney
  - 2. Type H-2: Medium weight door, average frequency, steel, non-removable pins. Hinges on interior doors shall be satin chrome plated finish 652. Hinges on exterior doors shall be completely stainless-steel finish 630.
    - a. Hinge ..... FBB179..... 4-1/2 x 4-1/2 NRP .....Stanley
    - b. Hinge ..... BB1279..... 4-1/2 x 4-1/2 NRP .....Hager
    - c. Hinge ..... TA2714 ..... 4-1/2 x 4-1/2 NRP .....McKinney
  - 3. Type H-3: Concealed, medium weight door, average frequency, steel.
    - a. Hinge ..... 216..... .....626 .....Soss
    - b. Hinge ..... MK80 ..... .....626 .....McKinney
  - 4. Type H-4: Medium weight door, average frequency, steel. (Continuous Piano hinge)
    - a. Hinge ..... STS314 1/4..... .....626 .....Stanley
  - 5. Type H-5: Medium weight door, average frequency, steel, 5-inch high, non-removable pins. Hinges on interior doors shall be satin chrome plated finish 652. Hinges on exterior doors shall be completely stainless-steel finish 630.
    - a. Hinge ..... FBB179..... 4-1/2 x 5 NRP .....Stanley
    - b. Hinge ..... BB1279..... 4-1/2 x 5 NRP .....Hager
    - c. Hinge ..... TA2714 ..... 4-1/2 x 5 NRP .....McKinney

2.3 LOCKS, LATCHES, AND BOLTS

- A. Subject to compliance with requirements, provide locks, latches and bolts of one of the following manufacturers and as specified below:
  - 1. Best.
  - 2. Corbin Russwin.
  - 3. Sargent.
  - 4. Schlage.
  - 5. Yale.
  
- B. Materials:
  - 1. Mortise Locks: ANSI A156.13, Grade 1, equipped with 6 pin tumbler. Provide 2 3/4-inch backset. Provide three keys per cylinder.
  - 2. Latch Sets: ANSI/BHMA A156.2 Series 4000, Grade 1. Provide 2 3/4 inch backset. Provide three keys per cylinder.
  - 3. Strikes: ANSI Strikes, 1-1/4 x 4-7/8 inches, with curved lip. Wrought box strikes, with extended lip for latch bolts, except open strike plates may be used in wood frames. Provide dustproof strikes for foot bolts.
  - 4. Tactile Warning: Provide lever handles with manufacturer's standard tactile warning per handicapped codes when required by local authority.
  
- C. Keying
  - 1. General:
    - a. Incorporate a security system to ensure that keys used during construction do not open doors after United States Postal Service occupancy.
    - b. Key side of locks shall be on the public side.
    - c. Master and submaster key system shall conform to United States Postal Service criteria. Doors at exterior of facility, from public area to workroom, and Stamped Envelope Storage shall not be on the master/submaster keying schedule. Other areas, based on need or local preference, may be excluded from master/submaster keying schedule.
  
  - 2. Construction Keying:
    - a. Furnish exterior door lock sets with keyed alike removable construction core cylinders for use during construction.
    - b. Restrict distribution of construction keys. Maintain record of persons who have received keys and deliver copies of record to USPS Project Manager upon request.
    - c. Provide permanent cores to Postmaster prior to substantial completion. Postmaster shall store them securely until needed. At substantial completion and at USPS Project Manager direction, remove construction cores and replace with permanent cores in presence of Project Manager. Provide keys to Project Manager and return construction cores to manufacturer.
  
  - 3. Permanent Keying:
    - a. Master locks and cylinders are to match the United States Postal Service existing keying system if a system exists.
    - b. Master to open all doors, except entrance doors to facility, doors from public area to workroom, and Stamped Envelope Storage shall not be on any master key system.
  
- D. Cylinders and Thumbturns by types:
  - 1. Type B-1: Rim Cylinder.
    - a. Cylinder..... 1109.....626 .....Yale
    - b. Cylinder..... 20-022 .....626 .....Schlage
    - c. Cylinder..... 3000-200 .....626 .....Corbin Russwin
  
  - 2. Type B-2: Mortise Cylinder.
    - a. Cylinder..... 2153 w/ 1161 series cam .....626 .....Yale
    - b. Cylinder..... 20-013 .....626 .....Schlage
    - c. Cylinder..... 1000-A03 .....626 .....Corbin Russwin

- 3. Type B-3: Cylinder Guard
  - a. Cylinder Guard ..... MS4043 .....630 .....Adams Rite

E. Locks and Latches by types:

- 1. Type L-1 Hotel Lock (similar to ANSI F15)
  - a. AUR 8832FL w/security collar .....626 .....Yale
  - b. ML2029 NSA w/security collar .....626 .....Corbin Russwin
  - c. L9485P-06 w/security collar .....626 .....Schlage
- 2. Type L-2 Classroom Lock (ANSI F84)
  - a. AU 5408LN ..... 626 ..... Yale
  - b. CL 3555 .....626 .....Corbin Russwin
  - c. ND70PD.....626 ..... Schlage
- 3. Type L-3 Entrance Lock (ANSI F20)
  - a. AUR 8847FL w/security collar .....626 .....Yale
  - b. ML2067 w/ security collar .....626 .....Corbin Russwin
  - c. L9453P-06A w/ security collar .....626 .....Schlage
- 4. Type L-4 Storeroom Lock (ANSI F86)
  - a. AU 5405LN .....626 .....Yale
  - b. CL3557 .....626 .....Corbin Russwin
  - c. ND80PD.....626 .....Schlage
- 5. Type L-5 Privacy Lock (ANSI F76)
  - a. AU 5402LN .....626 .....Yale
  - b. CL3520 .....626 .....Corbin Russwin
  - c. ND40S .....626 .....Schlage
- 6. Type L-6 Closet Deadbolt (ANSI E2151)
  - a. D111 .....626 .....Yale
  - b. 470.....626 .....Sargent
- 7. Type L-7 Passage
  - a. AU 5401LN (F75) .....626 .....Yale
  - b. CL3510 .....626 .....Corbin Russwin
  - c. ND10S .....626 .....Schlage

2.4 PUSH/PULL UNITS

A. Pulls and Pushes Manufacturers: Subject to compliance with requirements, provide from one of the following manufacturers as specified below.

- 1. H. B. Ives.
- 2. Trimco.
- 3. Rockwood.
- 4. Baldwin.
- 5. Adams Rite

B. Materials: ANSI A156.6 for 0.050-inch thickness.

C. Push and Pulls by types:

- 1. Type P-1: Push 4-inch x 16 inch.
  - a. 1001-3.....630 .....Trimco
  - b. 70C .....630 .....Rockwood
- 2. Type P-2 Pull: 4-inch x 16 inch.
  - a. 1010-3.....630 .....Trimco
  - b. 132 x 70C .....630 .....Rockwood
- 3. Type P-3 Pull: 2.75-inch x 11.5 inch.
  - a. 3001 fixed pull .....629 .....Adams Rite

## 2.5 EXIT DEVICES

- A. Exit Devices: Subject to compliance with requirements, provide exit devices of one of the following manufacturers and as specified below.
1. Corbin Russwin.
  2. Yale.
  3. Von Duprin.
  4. Adams Rite.
  5. Sargent.
  6. Securitech Group Inc.
- B. Exit Only Door Alarms:
1. SDA103 .....SECURITECH
- C. Materials:
1. Provide exposed metal to match hardware.
  2. Size and mount units indicated or, if not indicated, to comply with manufacturer's recommendations for exposure condition. Reinforce substrate as recommended.
- D. Exit Devices by types:
1. Type E-1: Exit Device (F01) (for wood and metal doors)
    - a. 8700 w/ security interlock nose guard/strike .....628 .....Adams Rite
  2. Type E-2: Exit Device (F04) (for narrow stile rim for aluminum doors)
    - a. 8800 x cyl. dog w/ security interlock nose guard/strike .....630 .....Adams Rite
  3. Type E-3: Exit Device (F03) (for wood and metal doors)
    - a. 8700 x cyl. dog w/ security interlock nose guard/strike .....628 .....Adams Rite
  4. Type E-3: Not Used
  5. Type E-4EM: Electromechanical Access Control Device
    - a. Centurion 8155-DX2 Series.....Securitech
    - b. Trilogy DL 3500 SERIES .....628 .....Alarm Lock
    - c. Yale Nextouch NTB 630 series .....626 .....Yale

## 2.6 CLOSERS

- A. Closers: Subject to compliance with requirements, provide closers of one of the following manufacturers and as specified below.
1. LCN.
  2. Norton.
  3. Yale.
- B. Materials & Features:
1. ANSI A156.4, Grade 1.
  2. ADA/ANSI A117.1
  3. U.L. listed. Provide closers for fire rated openings in compliance with NFPA 80, NFPA 101, and local building codes.
  4. Non-Sized; adjustable 1 to 5 pounds.
  5. 180-degree door opening.
  6. Heavy Duty parallel arm.
  7. Standard Cover.
  8. Provide exposed metal to match hardware.
  9. Mounting: Mount closers as follows unless indicated otherwise:
    - a. Interior side of exterior doors.
    - b. Opposite side of public side.
    - c. Workroom side of doors leading to or from the Workroom.
    - d. Room side of corridor doors.
  10. Size and mount units indicated or, if not indicated, to comply with manufacturer's recommendations for exposure condition. Reinforce substrate as recommended.
  11. Closers to be installed to allow door swing as shown on drawings.

- C. Closers by types:
  - 1. Type C-1:
    - a. 4011 .....689 .....LCN
    - b. P7500 .....689 .....Norton
    - c. 4400 .....689 .....Yale
  - 2. Type C-2: Parallel arm.
    - a. 4111 .....689 .....LCN
    - b. P7500 .....689 .....Norton
    - c. 4400 .....689 .....Yale

2.7 STOPS, HOLDERS AND BUMPERS

- A. Stop and Holder, Floor and Wall Stop, and Bumper Manufacturers: Subject to compliance with requirements, provide from one of the following manufacturers as specified below.
  - 1. H. B. Ives.
  - 2. Quality Hardware Manufacturing Co., Inc.
  - 3. Trimco.
  - 4. Dor-O-Matic.
  - 5. Glenn-Johnson.
- B. Materials:
  - 1. Door stops mounting: Methods to suit substrates encountered (plastic anchor, drywall anchor, expansion shield).
  - 2. Provide grey rubber exposed resilient parts.
  - 3. Do not furnish aluminum floor stops.
  - 4. Where a doorstop is specified in the Hardware Schedule, provide a wall stop type (S-1). However, if circumstances prevent a wall stop installation (door too far from perpendicular wall, door swing into adjacent glass, etc.) then substitute a type (S-2) or (S-3) floor stop as indicated for use intended.
  - 5. Adjust height of floor stops to suit undercut of adjacent door.
- C. Stops, Holders and Bumpers by types:
  - 1. Type S-1: Wall Stop - Install with appropriate anchors for substrate encountered.
    - a. 1270W .....630 .....Trimco
    - b. 407 1/2C .....630 .....Ives
    - c. 409 .....630 .....Rockwood
  - 2. Type S-2: Floor Stop - Install with appropriate anchors for substrate encountered.
    - a. 1201 .....626 .....Trimco
    - b. FS444 .....626 .....Ives
    - c. 471 .....626 .....Rockwood
  - 3. Type S-3: Floor Stop - Install with appropriate anchors for substrate encountered.
    - a. W1211 .....630 .....Trimco
    - b. FS436 .....630 .....Ives
    - c. 440/442 .....626 .....Rockwood

2.8 THRESHOLDS

- A. Threshold Manufacturers: Subject to compliance with requirements, provide from one of the following manufacturers as specified below.
  - 1. Pemko.
  - 2. National Guard.
  - 3. Reese.
  - 4. Zero.
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.



- C. Thresholds by types:
  - 1. Type T-2: Saddle threshold for floor finish at doors (either VCT to VCT or VCT to tile or sealed concrete.)
    - a. VCT to VCT:
      - 271 .....628 .....Pemko
      - HD5A .....628 .....Reese
      - 425E .....628 .....National
    - b. VCT to Tile/Concrete:
      - 158.....628 .....Pemko
      - S514A.....628 .....Reese
      - 653.....628 .....National
  - 2. Type T-3 (with weather seal):
    - a. S483AV.....628 .....Reese
    - b. 2005AT .....628 .....Pemko
    - c. 896V .....628 .....National

2.9 WEATHERSTRIPPING

- A. Weatherstripping Manufacturers: Subject to compliance with requirements, provide from one of the following manufacturers as specified below.
  - 1. Pemko.
  - 2. Reese.
  - 3. Zero.
  - 4. National Guard.
  
- B. Weatherstripping by types:
  - 1. Type W-1: Door Gaskets.
    - a. 807A .....Reese
    - b. 303AS .....Pemko
    - c. 160VS .....GP

2.10 MISCELLANEOUS HARDWARE

- A. Miscellaneous Hardware Manufacturers: Subject to compliance with requirements, provide from the manufacturers specified below.
  
- B. Provide door silencers for all doors unless indicated otherwise.
  
- C. Miscellaneous Hardware by types:
  - 1. Type M-1: Acoustical Perimeter Door Seal
    - a. 379 APK .....628 .....Pemko
  - 2. Type M-2: Dead Lock, (ANSI E0191) - w/ No exposed trim on lobby side.
    - a. D200 Series .....630 .....Yale
  - 3. Type M-3: Security Viewer. Mounted/installed, centered at 5-foot AFF.
    - a. 1756 .....630 .....Hager
    - b. 627 .....626 .....Rockwood
  - 4. Type M-4: Astragal
    - a. 184A .....628 .....Reese
    - b. 359A .....628 .....Pemko
  - 5. Type M-5: Silencers
    - a. 1229A .....Gray.....Trimco
    - b. SR64 .....Ives
    - c. 608 .....Grey.....Rockwood
  - 6. Type M-6: Flushbolts
    - a. 3917 .....626 .....Trimco
    - b. 555 .....626 .....Rockwood

- 7. Type M-7: Astragal
  - a. 276C .....628 .....Reese
  - b. 355CS .....628 .....Pemko
- 8. Type M-8: Kick Plates
  - a. K0050 8 x 34 .....630 .....Trimco
  - b. KP1050 8 x 34 .....630 .....Rockwood
- 9. Type M-9: Armor Plate; 40 inches H x 46 inches W (both sides of door) 630
- 10. Type M-10: Emergency Exit Alarm with Contacts:
  - a. SDA103: Securitech Group Incorporated
    - 1) Provide concealed door contacts and a separate alarm unit with keyed reset switch. Alarm unit will have local 110 db minimum audible alarm and a 75-cd visual alarm (strobe light) and shall be from an independent 120 Volt power supply equipped with a backup battery to power the alarm for one hour in the event of a loss of power, and to continually charge the battery. Battery operated door or panic bar mounted alarms are not allowed.
    - 2) Exit alarm shall be equipped with a keyed reset station mounted top at 60 inches AFF.
    - 3) Alarm to be located directly above the door 9 feet above the finished floor. Provide door sign indicating alarm will sound when opened and labeled, "EMERGENCY EXIT ONLY - RE-ENTRY PROHIBITED".
- 11. Type M-11: Reinforcing Pivot Hinges
  - a. 253 .....652 .....Hager
  - b. B1923 .....652 .....McKinney
- 12. Type M-12: Bumper (Install on push side of door at same height as lockset, in line with lever handle of lockset and approximately 2 inches away from the handle.)
  - a. 170-19 .....630 .....Bommer
- 13. Type M-13: Door Bottom Shoe
  - a. DES-3C, 1-1/4 inches x 1-3/4 inches width .....630 .....Hiawatha

## 2.11 FABRICATION

- A. Finish and Base Material Designations: Number indicate BHMA Code or nearest traditional U.S. commercial finish.
- B. Where base material and quality of finish are not otherwise indicated, provide at least commercially recognized quality specified in applicable Federal Specifications.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify that doors and frames are ready to receive Work and dimensions are as instructed by the manufacturer.
  - 2. Verify that electric power is available to power operated devices and of the correct characteristics.
- C. Report in writing to USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION

- A. Where not specified under other sections to be performed by manufacturer or suppliers, machine, fit and drill wood and metal doors.
- B. Prepare doors of various types to receive hardware, using templates and instructions provided with the hardware items for jobsite work.
- C. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by USPS Project Manager.
  - 1. Conform to requirements United States Postal Service "Standards for Facility Accessibility by the Physically Handicapped" Handbook RE-4.
- D. 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, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division 9 sections. Do not install surface mounted items until finishes have been completed on the substrate.
- E. Installer of security hardware is to be trained and familiar with product.
- 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. Set thresholds for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant.

### 3.3 ADJUSTING

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. 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 final check and adjustment of all hardware items in such space or area. Clean 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.
- D. Instruct United States Postal Service Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct United States Postal Service personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.4 HARDWARE SCHEDULE

- A. General requirements, see respective paragraphs above for details:
1. Ensure that keys used during construction cannot open doors after United States Postal Service occupancy.
  2. Provide door silencers for all doors unless indicated otherwise.

---

SET 1

Vestibule Storefront Entry Pair Doors  
Exterior Storefront Entry Pair Doors  
Each set to have:  
6 each .....Hinges – by Storefront Manufacturer  
2 each .....Exit Device – by Storefront Manufacturer  
2 each .....(B-1) Rim Cylinder  
1 each .....Threshold – by Storefront Manufacturer  
2 each .....Closer – by Storefront Manufacturer  
1 each .....Weatherstripping – by Storefront Manufacturer  
2 each .....Pulls – by Storefront Manufacturer

---

SET 2

NOT USED

---

SET 3

Automatic Storefront Doors  
Provide final cylinder cores. Coordinate with Section 084229.

All other hardware is furnished by Automatic Entrance Door supplier as specified in Section 084229.

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SET 4

Lunchroom to Exterior Break Area  
Workroom to Mail Vestibule  
Express Mail to Open Mail Platform  
Exterior Contractor Driver Entry  
Each set to have:  
3 each .....(H-2) Hinges  
1 each .....(E-3) Exit Device  
1 each .....Closer  
1 each .....(T-3) Threshold  
1 set .....(W-1) Door Gaskets  
1 each .....Electric Strike – provided as part of the ePACS system  
1 each .....Door Contact – provided as part of the ePACS system  
2 each .....Card Reader – provided as part of the ePACS system  
1 each .....Video/Intercom Call Station (at Contract Driver Only) – provided as part of the ePACS system

---

SET 5

Workroom to Exterior Pair Doors  
Administration to Exterior Pair Doors  
Maintenance Support Area to Exterior Pair Doors  
Each set to have:  
6 each .....(H-2) Hinges  
2 each .....(E-3) Exit Device  
2 each .....Closers

- 1 each .....(T-3) Threshold
  - 1 set .....(W-1) Door Gaskets
  - 1 each .....Astragal
  - 1 each .....Rain Drip (if no overhead cover)
  - 2 each .....Magnetic Lock – provided as part of the ePACS system
  - 2 each .....Door Contact – provided as part of the ePACS system
  - 2 each .....Card Reader – provided as part of the ePACS system
  - 1 each .....Exit Door Alarm – provided as part of the ePACS system
- 

SET 6

- Carrier Vestibule Personnel to Exterior
  - Enclosed Platform: Platform to Dock Stairs
  - Mail Vestibule Personnel to Exterior and to Workroom
  - Workroom to Exterior
  - Administration to Exterior
  - Maintenance to Exterior
  - Each set to have:
    - 3 each .....(H-2) Hinges
    - 1 each .....(E-3) Exit Device
    - 1 each .....(T-3) Threshold
    - 1 each .....Doorstop
    - 1 each .....Closer
    - 1 set .....(W-1) Door Gaskets
    - 1 each .....Electric Strike – provided as part of the ePACS system
    - 1 each .....Door Contact – provided as part of the ePACS system
    - 2 each .....Card Reader – provided as part of the ePACS system
    - 1 each .....Exit Door Alarm – provided as part of the ePACS system
- 

SET 7

- Exterior Emergency Exit
  - Each set to have:
    - 3 each .....(H-2) Hinges
    - 1 each .....(E-1) Exit Device
    - 1 each .....(T-3) Threshold
    - 1 set .....(W-1) Door Gaskets
    - 1 each .....Closer
    - 1 each .....Rain Drip
    - 1 each .....Door Contact – provided as part of the ePACS system
    - 1 each .....Exit Door Alarm – provided as part of the ePACS system
- 

SET 8

- Maintenance Shop to Exterior Pair Doors
- Each set to have:
  - 6 each .....(H-2) Hinges
  - 1 each .....(L-1) Hotel Lock (Similar to F15)
  - 1 each .....(T-3) Threshold
  - 1 set .....(W-1) Door Gaskets
  - 1 set .....(M-6) Flushbolts (Top & bottom)
  - 1 each .....(M-7) Astragal
  - 2 each .....(S-1) Door Stop
  - 2 each .....Closers
  - 1 each .....Rain Drip
  - 1 each .....Request to Exit Motion Sensor – provided as part of the ePACS system
  - 2 each .....Magnetic Locks – provided as part of the ePACS system

- 2 each .....Door Contacts – provided as part of the ePACS system
- 1 each .....Door Release Push Button – provided as part of the ePACS system
- 1 each .....Card Reader – provided as part of the ePACS system

---

SET 9

Electrical to Exterior – Main

Each set to have:

- 3 each .....(H-2) Hinges
- 1 each .....(L-1) Hotel Lock (Similar to F15)
- 1 each .....(T-3) Threshold
- 1 set .....(W-1) Door Gaskets
- 1 each .....Closer
- 1 each .....Rain Drip
- 1 each .....Request to Exit Motion Sensor – provided as part of the ePACS system
- 1 each .....Electric Strike – provided as part of the ePACS system
- 1 each .....Card Reader – provided as part of the ePACS system
- 1 each .....Door Contact – provided as part of the ePACS system

---

SET 10

CIO Covert Entry to Exterior

Each set to have:

- 3 each .....(H-2) Hinges w/ NRP
- 1 each .....(L-1) Hotel Lock (Similar to F15), Note: the lock must be specified model from Yale, substitutions are not permitted.
- 1 each .....Cylinder, USPS Furnished (PSIN#091SP), Contractor Installed
- 1 each .....(T-3) Threshold
- 1 set .....(W-1) Door Gaskets
- 1 each .....(M-3) Security Viewer
- 1 each .....(M-13) Door Bottom Shoe
- 1 each .....Door Stop
- 1 each .....Closer
- 1 each .....Rain Drip

---

SET 11

Enclosed Platform to Exterior Pair Doors

Building and Grounds Room Pair Doors

Each set to have:

- 6 each .....(H-2) Hinges w/NRP
- 1 each .....(L-1) Hotel Lock (Similar to F15)
- 1 each .....(T-3) Threshold
- 1 set .....(W-1) Door Gaskets
- 1 set .....(M-6) Flushbolts (Top and bottom)
- 1 each .....(M-7) Astragal
- 1 each .....(S-1) Door Stop
- 1 each .....Closer
- 1 each .....Rain Drip

---

SET 12

Electrical to Exterior

Recycling to Exterior

Each set to have:

- 3 each .....(H-2) Hinges
- 1 each .....(L-1) Hotel Lock (Similar to F15)

1 each .....(T-3) Threshold  
1 set .....(W-1) Door Gaskets  
1 each .....Closer  
1 each .....Rain Drip

---

SET 13

NOT USED

---

SET 14

NOT USED

---

SET 15

Admin to Lobby Pair Doors

Each set to have:

6 each .....(H-2) Hinges  
2 each .....(E-3) Exit Device  
2 each ..... Closers  
2 each .....Magnetic Locks – provided as part of the ePACS system  
2 each .....Door Contacts – provided as part of the ePACS system  
2 each .....Card Reader – provided as part of the ePACS system  
1 each .....Exit Door Alarm – provided as part of the ePACS system  
1 each .....Video/Intercom Call Station – provided as part of the ePACS system

---

SET 16

Admin to Lobby

Admin to Workroom

Each set to have:

3 each .....(H-2) Hinges  
1 each .....(L-1) Hotel Lock (Similar to F15)  
1 each .....Door Stop  
1 each .....Closer  
1 each .....Electric Strike – provided as part of the ePACS system  
2 each .....Card Reader – provided as part of the ePACS system  
1 each .....Door Contact – provided as part of the ePACS system  
1 each .....Request to Exit Motion Sensor – provided as part of the ePACS system  
1 each .....Video/Intercom Call Station – provided as part of the ePACS system

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SET 17

Tools/Parts to Workroom Pair Doors

Workroom to Administration Pair Doors

Corridor to Consolidated Computer Room or “APD” Pair Doors

Workroom to Maintenance/Support Areas Pair Doors

Mechanical Rooms Pair Doors

Accountable Paper Depository (APD) Postal Equipment to Workroom Pair Doors

Each set to have:

6 each .....(H-1) Hinges  
1 each .....(L-1) Hotel Lock (Similar to F15)  
1 set .....(M-6) Flushbolts (Top & bottom)  
2 each ..... Closers  
2 each .....Wall Stops  
2 each .....Door Contacts – provided as part of the ePACS system  
2 each .....Magnetic Locks – provided as part of the ePACS system

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- 1 each .....Request to Exit Motion Sensor – provided as part of the ePACS system
- 1 each .....Door Release Push Button – provided as part of the ePACS system
- 1 each .....Card Reader – provided as part of the ePACS system

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SET 18

- Tools/Parts to Workroom
- Workroom to Administration
- Corridor to Consolidated Computer Room or APD
- Workroom to Maintenance/Support Areas
- Mechanical Room - Main
- Accountable Paper Depository (APD)
- Equipment Rooms Containing ePACS Equipment
- Electrical Room - Main
- Storage Rooms – Containing Equipment
- Each set to have:
  - 3 each .....(H-1) Hinges
  - 1 each .....(L-1) Storeroom Lock
  - 1 each .....Door Stop
  - 1 each .....Closer
  - 1 each .....Card Reader – provided as part of the ePACS system
  - 1 each .....Electric Strike – provided as part of the ePACS system
  - 1 each .....Door Contact – provided as part of the ePACS system
  - 1 each .....Request to Exit Motion Sensor – provided as part of the ePACS system

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SET 19

- CIO to Workroom
- Each set to have:
  - 3 each .....(H-2) Hinges
  - 1 each .....(L-1) Hotel Lock (Similar to F15)
    - Note: the lock must be the specified model from Yale, substitutions are not permitted.
  - 1 each .....Cylinder, USPS Furnished (PSIN# 0931A0), Contractor Installed
  - 1 each .....(T-3) Threshold
  - 1 each .....(M-13) Door Bottom Shoe
  - 1 each .....(M-1) Acoustical perimeter seal
  - 1 each .....Door Stop
  - 1 each .....Closer

---

SET 20

- Custodial Supplies
- Postal Records
- Recycling Room to Workroom
- BMEU Storage to Workroom
- Each set to have:
  - 3 each .....(H-1) Hinges
  - 1 each .....(L-4) Storeroom Lock (F86)
  - 1 each .....Door Stop
  - 1 each .....Closer

---

SET 21

- Work Area to Office
- Manager's Office to Admin Corridor
- Conference Room to Admin Corridor
- Janitor's Closet to Workroom



Meeting Room  
Closet  
Label Room  
Each set to have:  
3 each .....(H-1) Hinges  
1 each .....(L-2) Classroom Lock (F84)  
1 each .....Door Stop  
1 each .....Closer

---

SET 22

BMEU to Scale room to Workroom  
BMEU Customer Service to Workroom  
Each set to have:  
3 each .....(H-2) Hinges  
1 each .....(L-3) Entrance Lock (ANSI F20)  
1 each .....(T-2) Threshold  
1 each .....(M-13) Door Bottom Shoe  
1 each .....Door Stop (interior doors only)  
1 each .....Closer

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SET 23

BMEU Lobby to Mail Platform  
Each set to have:  
3 each .....(H-2) Hinges  
1 each .....(L-3) Entrance Lock (F20)  
1 each .....(T-3) Threshold  
1 set .....(W-1) Door Gaskets  
1 each .....(M-13) Door Bottom Shoe  
1 each .....Closer

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SET 24

BMEU Scale Room to Staging Area in Workroom  
Each set to have:  
3 each .....(H-5) Hinges (5-inch)  
1 each .....(L-4) Storeroom Lock (F86)  
1 each .....Door Stop  
1 each .....Closer

---

SET 25

BMEU Scale Room to Mail Platform Pair Doors  
Each set to have:  
6 each .....(H-2) Hinges  
1 each .....(L-1) Hotel Lock  
1 each .....(T-3) Threshold  
1 set .....(W-1) Door Gaskets  
1 each .....(M-6) Flushbolts  
1 each .....(M-7) Astragal  
2 each .....(M-13) Door Bottom Shoe  
1 each .....Closer

---

SET 26

Toilet - single occupancy

Each set to have:  
3 each .....(H-1) Hinges  
1 each .....(L-5) Privacy Lock (F76)  
1 each .....(T-1) Threshold  
1 each .....Door Stop  
1 each .....Closer

---

SET 27

Toilet - multiple occupancy  
Carrier Vestibule Personnel to Workroom  
Lunchroom

Each set to have:  
3 each .....(H-1) Hinges  
1 each .....(P-1) Push  
1 each .....(P-2) Pull  
1 each .....(M-8) Kick Plate  
1 each .....Door Stop  
1 each .....Closer

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SET 28

NOT USED

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SET 29

NOT USED

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SET 30

Mail and Carrier Vestibule Impact Doors  
All hardware furnished by Impact Door supplier as specified in Section 083800

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SET 31

Mail Platform Sectional Overhead Door: All hardware furnished by Sectional Overhead Door supplier as specified in Section 083613.

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SET 32

Highspeed Rollup Door  
Each set to have:  
1 each .....Long Range Card Reader – provided as part of the ePACS system  
1 each .....Card Reader – provided as part of the ePACS system  
All other controls and hardware by Overhead Door Supplier

END OF SECTION

USPS MPF Specification

## SECTION 088000

### GLAZING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Insulated glass units, low E.
  - 2. Insulated tempered glass units, low E.
  - 3. Clear tempered glass.
  - 4. Wire glass.
  - 5. One-way reflective mirror glass.
  - 6. Insulated glass units with security film, low E.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections:
  - 1. Section 084113 - Aluminum-Framed Entrances and Storefronts: Glazed doors and storefronts.
  - 2. Section 084229 - Automatic Entrances.

##### 1.2 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 2. ASTM C1036 - Standard Specification for Flat Glass.
  - 3. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
  - 4. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
  - 5. ASTM E2010-01 - Standard Method for Positive Pressure Fire Tests of Window Assemblies.
  - 6. ASTM F1233 - Standard Test Method for Security Glazing Materials and Systems.
- C. Consumer Product Safety Standards for Architectural Glazing. CPSC 16 CFR, Part 1201.
- D. Flat Glass Marketing Association (FGMA):
  - 1. FGMA - Glazing Manual and Glazing Sealing Systems Manual.
- E. National Fire Protection Association (NFPA)
  - 1. NFPA 257 – Fire Tests of Window Assemblies.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data:
    - a. Glass: Structural, physical, and environmental characteristics, size limitations, special handling, or installation requirements.

- b. Glazing compound: Provide chemical, functional, and environmental characteristics, limitations, special application requirements.
  - 2. Samples:
    - a. Glazing: Submit one sample 12 x 12 inches in size of each type of glazing, illustrating tinting, and finish of glazing materials. Label each sample indicating kind, quality, and manufacturer.
  - 3. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.
- B. Section 017704 – Closeout Procedures and Training: Procedures for closeout submittals.
  - 1. Submit written special warranty with forms completed in United States Postal Service name and registered with manufacturer as specified in this section.

#### 1.4 QUALITY ASSURANCE

- A. Identification: Each unit of tempered glass and burglar resistant glazing shall be permanently identified by the manufacturer. The identification shall be etched or ceramic fired on the glass and be visible when the unit is glazed.
- B. Provide Energy Star Label on glazing indicating compliance with DOE Energy Star requirements.
- C. Perform Work in accordance with FGMA Glazing Manual.
- D. Installer Qualifications: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.

#### 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
  - 1. Do not install glazing when ambient temperature is less than 40 degrees F.
  - 2. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### 1.7 WARRANTY

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Special Warranty:
  - 1. Include coverage for cracking, breakage, and replacement of same.
    - a. Warranty Period: 1 year.
  - 2. Include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
    - a. Warranty Period: 10 years.
  - 3. Include coverage for delamination of laminated glass and replacement of same.
    - a. Warranty Period: 5 years.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Pilkington, Toledo, OH (800)221-0444.
  - 2. Vitro Architectural Glass, Cheswick, PA (855) 887-6457.
  - 3. Viracon, Owatonna, MN (800) 533-2080.
- B. Subject to compliance with project requirements, manufacturers offering security film products which may be incorporated in the Work include the following:
  - 1. 3M, St. Paul, MN (800) 480-1704.
- C. Subject to Compliance with project requirements, manufacturers offering wire glass products which may be incorporated with the work includes the following:
  - 1. Technical Glass Products, Snoqualmie, WA, (800) 426-0279.
- D. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 GLASS MATERIALS

- A. Glass Type 1 - Insulated Glass Units, Low E: Double pane units with inner pane of clear annealed glass and outer pane of tinted annealed glass. Coating on inner side of outer panel.
  - 1. Where required by code, provide Glass Type 2 (tempered).
  - 2. Glass Thickness, Inner: 1/4 inch.
  - 3. Glass Thickness, Outer: 1/4 inch.
  - 4. Tint Color Shall match existing conditions glazing as well as meet all IECC requirements for this project.
  - 5. Visible Reflectance: Shall match existing conditions glazing.
  - 6. Visible Transmittance: Shall match existing conditions glazing.
  - 7. Unit Thickness: 1 inch thick units. 1/4 inch thick, clear inner pane. 1/4 inch thick, tinted outer pane. 1/2 inch air space between panes.
- B. Glass Type 2 - Insulated Tempered Glass Units, Low E: Double pane units with inner pane of clear tempered glass and outer pane of tinted tempered glass. Coating on inner side of outer panel.
  - 1. Glass Thickness, Inner: 1/4 inch.
  - 2. Glass Thickness, Outer: 1/4 inch.
  - 3. Tint Color: Shall match existing conditions glazing as well as meet all IECC requirements for this project.
  - 4. Visible Reflectance: Shall match existing conditions glazing.
  - 5. Visible Transmittance: Shall match existing conditions glazing.
  - 6. Unit Thickness: 1 inch thick units. 1/4 inch thick, clear inner pane. 1/4 inch thick, tinted outer pane. 1/2 inch air space between panes.
- C. Glass Type 3 - Clear Tempered Glass: ASTM C 1048, Kind FT (Fully Tempered), Condition A (Uncoated), Type I (Transparent Glass, Flat), Class 1 (Clear), Quality q3 (Glazing Select). Conform to ANSI Z97.1 and CPSC 16CFR Part 1201.
  - 1. Thickness: 1/4 inch, unless indicated otherwise.
- D. Glass Type 4 - Wire Glass: Fire Rated Impact Safety Rated Wire Glass with Surface Applied Film.
  - 1. Glass Thickness: 1/4 inch.
  - 2. Fire rated surface film as approved by manufacturer.
  - 3. Mesh: Woven stainless steel wire, 1/2 inch grid size.
  - 4. Impact safety resistance: ANSI Z97.1 and CPSC 16CFR1201 (CAT I and II)

- 5. Fire rating: ASTM E2010-01, NFPA 257, UL9 and UL10C.
  
- E. Glass Type 5 - One-Way Reflective Mirror Glass : ASTM C1036, Type 1 transparent flat, Class 1 (clear), Quality q3 (Glazing Select):
  - 1. Thickness (at ceiling panel): 1/4 inch, tempered per ANSI Z97.1.
  - 2. Unit Thickness (at Criminal Investigative Office): 1 inch thick units. 1/4 inch thick clear inner pane. 1/4 inch thick mirrored outer pane. 1/2 inch air space between panes.
  
- F. Glass Type 6 - Insulated Glass Units with applied Security Film, Low E: Double pane units with inner pane of clear annealed glass and outer pane of tinted annealed glass. Coating on inner side of outer panel. Security film of a minimum 0.007 inch on the inner side of the inner panel.
  - 1. Glass Thickness, Inner: 1/4 inch.
  - 2. Glass Thickness, Outer: 1/4 inch.
  - 3. Tint Color Shall match existing conditions glazing as well as meet all IECC requirements for this project.
  - 4. Visible Reflectance: Shall match existing conditions glazing.
  - 5. Visible Transmittance: Shall match existing conditions glazing.
  - 6. Unit Thickness: 1 inch thick units. 1/4 inch thick, clear inner pane. 1/4 inch thick, tinted outer pane. 1/2 inch air space between panes.
  
- G. Glass Type 7 - Clear Tempered Glass with applied Security Film: ASTM C 1048, Kind FT (Fully Tempered), Condition A (Uncoated), Type I (Transparent Glass, Flat), Class 1 (Clear), Quality q3 (Glazing Select). Conform to ANSI Z97.1 and CPSC 16CFR Part 1201. Security film of a minimum 0.007 inch on the inner side of panel.
  - 1. Thickness: 1/4 inch, unless indicated otherwise.
  
- H. Glass Type 8 – Laminated Insulated Burglary Resistant Glass Units, Low E: Double pane units with inner pane of clear tempered glass and outer pane of tinted tempered or annealed laminated glass, conforming to: UL972 or ASTM F1233 Class Three Standard Test Method for Security Glazing and Systems. [Coating on inner side of outer panel.] [Coating on outer side of inner panel.]
  - 1. Glass Thickness, Inner: 1/4 inch.
  - 2. Glass Thickness, Outer: A laminated pane consisting of a 0.060-inch (60 mil) thick polyvinyl butyral (PVB) interlayer between two layers of 1/8-inch thick glass.
  - 3. Tint Color: Shall match existing conditions glazing as well as meet all IECC requirements for this project.
  - 4. Visible Reflectance: Shall match existing conditions glazing.
  - 5. Visible Transmittance: Shall match existing conditions glazing.
  - 6. Unit Thickness: 1 inch thick units. 1/4 inch thick, clear inner pane. 5/16 inch thick, tinted outer laminated pane. Nominal 1/2 inch air space between panes.

## 2.3 GLAZING COMPOUNDS

- A. Polysulphide Sealant: Two component, chemical curing, non-sagging type; cured Shore A hardness of 15-25.
- B. Silicone Sealant: Single component, chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; cured Shore A hardness of 15-25.
  - 1. Color: Clear.
- C. Acrylic terpolymer compounded especially for glazing, non-hardening, non-staining, and non-bleeding.

## 2.4 GLAZING ACCESSORIES

- A. Setting Blocks: Resilient blocks of 70 to 90 Shore A durometer hardness; compatible with glazing sealant.
- B. Spacers: Resilient blocks of 40 to 50 Shore A durometer hardness; self adhesive on one side; compatible with glazing sealant.
- C. Filler Rods: Closed cell or jacketed foam rods of polyethylene, butyl, neoprene, polyurethane, or vinyl; compatible with glazing sealant.
- D. Joint Cleaners, Primers, and Sealers: As recommended by glazing sealant manufacturer.
- E. Gaskets: ASTM D2000, SBC 415 to 3BC 620; extruded or molded neoprene or EPDM, black.
- F. Mastic: Non-solvent type adhesive as recommended by mirrored glass manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
  - 1. Verify that openings for glazing are correctly sized and within tolerance.
  - 2. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

#### 3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

#### 3.3 GLAZING

- A. Locate setting blocks at quarter points of sill; set in sealant if heel or toe bead is required.
- B. Install spacers inside and out except where pre-shimmed tape or glazing gaskets are to be used.
- C. Set each piece in a series to other pieces in pattern draw, bow, or other visually perceptible characteristics.
- D. Provide glazing sealants and gaskets as required for particular glazing application. Coordinate with other Sections for material compatibility.

- E. Gaskets:
  1. Provide adequate anchorage, particularly for driven-in wedge gaskets.
  2. Miter and weld ends of channel gaskets at corners to provide continuous gaskets.
  3. Seal face gaskets at corners with sealant to close opening and prevent withdrawal of gaskets from corners.
- F. Do not leave voids in glazing channels except as specifically indicated or recommended by glass manufacturer. Force sealant into channel to eliminate voids. Tool exposed surfaces to slight wash away from joint. Trim and clean promptly.
- G. Do not allow sealant to close weeps of aluminum framing.
- H. Provide filler rod where sealants are used in the following locations:
  1. Head and jamb channels.
  2. Colored glass over 75 united inches in size.
  3. Clear glass over 125 united inches in size.

### 3.4 INSTALLATION - BUTT GLAZED METHOD

- A. Temporarily brace tempered glass in position for duration of glazing process. Mask edges of glass at adjoining glass edges and between glass edges and framing members.
- B. Temporarily secure a small diameter non-adhering foamed rod on back side of joint.
- C. Apply silicone sealant to open side of joint in continuous operation; thoroughly fill the joint without displacing the foam rod. Tool the sealant surface smooth to concave profile.
- D. Permit sealant to cure then remove foam backer rod. Apply sealant to opposite side, tool smooth to concave profile.
- E. Remove masking tape.

### 3.5 CONSTRUCTION

- A. Interface with Other Work: Coordinate glazing with installation of entrances and storefronts specified in Section 084113.

### 3.6 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Inspect preparation and installation of glass.

### 3.7 CLEANING

- A. Section 017300 - Execution: Cleaning installed work.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after Work is complete.
- D. Clean glass and adjacent surfaces.



3.8 PROTECTION

- A. Section 017300 - Executions: Protecting installed work.
- B. After installation, mark pane with an 'X' by using removable plastic tape or paste. Do not mark reflective glass units.

END OF SECTION

USPS CSF Specification

## SECTION 088714

### SOLAR CONTROL GLAZING FILMS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes film products applied to glass surfaces to impart solar control performance for solar heat and UV reduction, glare reduction, privacy, fade protection, or aesthetic characteristics.

##### 1.2 DEFINITIONS

- A. Dual Reflective Films: Films where interior visible light reflectance is less than the exterior visible light reflectance. The lower interior reflectance provides improved visibility from the interior to the outdoors without affecting the film's solar performance.
- B. Emissivity: The ability of a surface to absorb far-infrared heat and to reflect it. The lower the emissivity, the lower the far-infrared heat absorption and the greater the far-infrared heat reflectance.
- C. Far-Infrared Heat: Heat radiated from objects at temperatures below 1300 deg F such as heat radiated from: room objects, objects heated by the sun, or a home heating system. Far-infrared heat is different from near-infrared heat that is heat radiated from objects at highly elevated temperatures such as the sun.
- D. Low Emissivity (Low-E) Films: Films with improved far-infrared heat reflection, with the ability to reduce winter heat loss through windows. The reflection of far-infrared heat also reduces the need for summer cooling by reducing the transmission of far-infrared heat from outdoor objects through windows into the interior of a home or building.
- E. Low Reflective Films: Films whose visible light reflectance values are very close to that of ordinary glass.
- F. Luminous Efficacy: Ratio of visible light transmission to shading coefficient for a glazing system.
- G. Neutral Solar Films: Films that allow visible light to pass without distortion of color and that have equal visible light transmission properties at all wavelengths in the visible range from 380 to 780 nanometers.
- H. Light to Solar Heat Gain Ratio: Ratio of visible light transmission to Solar Heat Gain Coefficient for a glazing system.
- I. Solar Heat Gain Coefficient: The fraction of incident solar radiation that passes through that window, including solar energy that is both directly transmitted and that which is absorbed and subsequently released inwardly by re-radiation and conduction. SHGC is expressed as a number between 0 and 1. The lower a window's solar heat gain coefficient, the less solar heat it transmits. This number is the mathematical complement of the TSER value: The sum of the TSER (Total Solar Energy Rejection, in decimal form) of a glazing system and its SHGC value is 1; therefore,  $1 - \text{TSER} = \text{SHGC}$
- J. Spectrally Selective Solar Films: Films that reduce solar heat gain mainly by reducing the transmission of near-infrared solar radiation with minimal reduction of visible light transmission. Films with a Light to Solar Heat Gain Ratio of above 1.00 are spectrally selective.

### 1.3 REFERENCES

- A. Section makes references to the following:
  - 1. ASTM E-84, "Test Method for Surface Burning Characteristics of Building Materials".
  - 2. ASTM E-903, "Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres."
  - 3. ASTM D-1044, "Test Method for Resistance of Transparent Plastics to Surface Abrasion."

### 1.4 PERFORMANCE REQUIREMENTS

- A. Thermal and Optical Performance Properties: Provide glazing films with performance properties specified (on 1/8-inch clear glass) based on manufacturer's published test data, as determined according to procedures indicated in ASHRAE Handbook of Fundamentals:
- B. All items listed below shall match the existing conditions glazing as well as meet all IECC requirements for this project region.
  - 1. Solar Energy Rejected:
  - 2. Shading Coefficient:
  - 3. Solar Reflectance:
  - 4. Solar Absorptance:
  - 5. Solar Transmittance:
  - 6. Visible Light Transmittance:
  - 7. Emissivity:
  - 8. U-Value (winter median):
  - 9. Light to Solar Heat Gain Ratio:
  - 10. Solar Heat Gain Coefficient:
  - 11. Ultraviolet Transmission: Provide films with UV absorbing materials that limit the weighted UV Transmission to less than 0.1 percent when measured in accordance with ASTM E-903.
- B. Scratch Resistance: Provide films that have 5.0 percent maximum haze increase when tested to ASTM D-1044, using 100 revolutions, a CS-10F Taber abraser and 500 g weights.
- C. Ultraviolet Transmission: Provide films with UV absorbing materials that limit the weighted UV Transmission to less than 0.1 percent when measured in accordance with ASTM E-903.
- D. Surface Burning Characteristics: Provide films that have Flame Spread Index of 0 and Smoke Development Index of 30 or less when tested in accordance with ASTM E-84.

### 1.5 SUBMITTALS

- A. Product Data (on 1/8-inch clear glass): For each film product indicated.
- B. Samples for Color Selection: Manufacturer's standard sample sets showing the full range of colors available for each type of product indicated.
- C. Samples for Verification: 12-inch square samples of each glazing film of each product color specified.
- D. 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.
- E. Closeout Submittals: Upon completion of the Work, submit the following:
  - 1. Executed warranty.
  - 2. Maintenance (cleaning) and replacement instructions.

### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing systems similar to those indicated for this Project and meeting the standards of the International Standards Organization (ISO), ISO 9001 Quality Assurance in Production and Installation.

- B. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by film manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements.
- C. Mockups: Apply glazing films in locations as directed to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
  - 1. Obtain approval of field samples before continuing with remainder of installation.
  - 2. Maintain field samples during remainder of installation in an undisturbed condition as a standard for judging the completed Work.
  - 3. Approved field samples may become part of the completed Work.
- D. Preinstallation Conference: Before installing glazing films, conduct conference at Project site. Conduct preinstallation conference in conjunction with installation of mockup.
  - 1. Meet with Owner, Architect, glazing film Installer and glazing film manufacturer's representative.
  - 2. Review methods and procedures related to installation, including manufacturer's written instructions.
  - 3. Examine substrate conditions for compliance with requirements.
  - 4. Review temporary protection measures required during and after installation.
  - 5. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing films according to manufacturer's written instructions and as needed to prevent damage condensation, temperature changes, direct exposure to sun, or other causes.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with film installation when ambient and substrate temperature conditions are outside limits permitted by manufacturer and when glass substrates are wet from frost, condensation, or other causes.

#### 1.9 WARRANTY

- A. Manufacturer's standard warranty agreeing to replace films that fail within [10 or 15 years] from date of original installation. [Warranty period dependant on specific product.]

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS/PRODUCTS

- A. Provide one of the following products:
  - 1. CPFilms Inc.; Vista® Film.
  - 2. 3m Commercial Prestige Series Window Film.
  - 3. Panorama Premier Plus Commercial Window Film.
- B. Product Description: Multi-layered product applied to interior glass surfaces, consisting of from outboard surface to inboard surface:
  - 1. Removable release liner.
  - 2. CDF adhesive.
  - 3. Clear or dyed ultraviolet absorbing layer of polyester film.
  - 4. Single or multiple layers of metallized or sputtered polyester film.
  - 5. Laminating adhesive.
  - 6. Scratch resistant coating.

- C. Color: Neutral.

## 2.2 GLAZING FILM ACCESSORIES

- A. General: Provide products complying with requirements of glazing film manufacturer for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Adhesive: Water activated, dry adhesive system that forms a molecular bond between the film and glass.
  - 1. Protect adhesive form contamination by applying a release liner that will be removed and discarded at installation.
- C. Cleaners, Primers, and Sealers: Types recommended by glazing film manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine glass and surrounding adjacent surfaces for conditions affecting installation.
  - 1. Report conditions that may adversely affect installation. In report, include description of any glass that is broken, chipped, cracked, abraded, or damaged in any way.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Beginning of installation means acceptance of conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Immediately before beginning installation of films, clean glass surfaces of substances that could impair glazing film's bond, including mold, mildew, oil, grease, dirt and other foreign materials.
- C. Protect window frames and surrounding conditions from damage during installation.

### 3.3 INSTALLATION

- A. General: Comply with glazing film manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
  - 1. Install film continuously, but not necessarily in one continuous length. Install with no gaps or overlaps.
    - a. If seamed, install with no gaps or overlaps. Install seams vertical and plumb. No horizontal seams allowed.
  - 2. Do not remove release liner from film until just before each piece of film is cut and ready for installation.
  - 3. Install film with mounting solution and custom cut to the glass with neat, square comers and edges to within 1/8 inch of the window frame.
  - 4. Remove air bubbles, wrinkles, blisters, and other defects.
- B. After installation, view film from a distance of 10 feet against a bright uniform sky or background. Film shall appear uniform in appearance with no visible streaks, banding, thin spots or pinholes.
  - 1. If installed film does not meet these criteria, remove and replace with new film.

### 3.4 CLEANING

- A. Remove excess mounting solution at finished seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended by glazing film manufacturer.
- C. Replace films that cannot be cleaned.

END OF SECTION

USPS MPF Specification

SECTION 092216  
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Framing systems.
  - 2. Suspension systems.

1.2 RELATED SECTIONS: May Include:

- A. SECTION 051200 – Structural Steel Framing
- B. SECTION 054000 – Cold-Formed Metal Framing

1.3 ACTION SUBMITTALS

- A. Product Data: For each product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation reports for firestop tracks .

1.5 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of AISI S220

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, in accordance with ASTM E119 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with AISI S220 for conditions indicated.
  - 1. Steel Sheet Components: Comply with AISI S220 requirements for metal unless otherwise indicated.

2. Protective Coating: Comply with AISI S220; ASTM A653/A653M, G40 (Z120); or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
    - a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.
- B. Studs and Track: AISI S220.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CEMCO; California Expanded Metal Products Co.
    - b. ClarkDietrich.
    - c. Custom Stud.
    - d. Jaimes Industries.
    - e. MBA Building Supplies
    - f. MRI Steel Framing, LLC.
    - g. Phillips Manufacturing Co.
    - h. SCAFCO Steel Stud Company.
    - i. Steel Construction Systems
  2. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
  3. Depth: As indicated on Drawings.
- C. High-Strength Steel Studs and Tracks: Roll-formed with surface deformations to stiffen the framing members.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CEMCO; California Expanded Metal Products Co.
    - b. ClarkDietrich.
    - c. Custom Stud.
    - d. Jaimes Industries.
    - e. MBA Building Supplies
    - f. MRI Steel Framing, LLC.
    - g. Phillips Manufacturing Co.
    - h. SCAFCO Steel Stud Company.
    - i. Steel Construction Systems
  2. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
  3. Depth: As indicated on Drawings.
- D. Slip-Type Head Joints: Where indicated, provide the following:
1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing **2-inch (51-mm)** minimum vertical movement.
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CEMCO; California Expanded Metal Products Co.
    - b. ClarkDietrich.
    - c. Custom Stud.
    - d. Jaimes Industries.
    - e. MBA Building Supplies.
    - f. MRI Steel Framing, LLC.
    - g. Phillips Manufacturing Co.



- h. SCAFCO Steel Stud Company.
  - i. Steel Construction Systems.
- 3. Single Long-Leg Track System: Top track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
- E. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CEMCO; California Expanded Metal Products Co.
    - b. ClarkDietrich.
    - c. Custom Stud.
    - d. Jaimes Industries.
    - e. MBA Building Supplies.
    - f. MRI Steel Framing, LLC.
    - g. Phillips Manufacturing Co.
    - h. SCAFCO Steel Stud Company.
    - i. Steel Construction Systems.
  - 2. Depth: As indicated on Drawings.
  - 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels:
  - 1. Minimum Base-Steel Thickness: As indicated on Drawings.
  - 2. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
  - 1. Configuration: hat shaped.
- I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Depth: As indicated on Drawings.
  - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
  - 3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 3/4 inch (19 mm), minimum uncoated-steel thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.

## 2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
  - a. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
- C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, in size indicated on Drawings.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Depth: As indicated on Drawings.
- F. Furring Channels (Furring Members):
  - 1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
  - 2. Steel Studs and Tracks: Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
    - a. Minimum Base-Steel Thickness: As indicated on Drawings.
    - b. Depth: As indicated on Drawings.
  - 3. High-Strength Steel Studs and Tracks:
    - a. Minimum Base-Steel Thickness: As indicated on Drawings.
    - b. Depth: As indicated on Drawings.
  - 4. Hat-Shaped, Rigid Furring Channels: 7/8 inch (22 mm) deep.
    - a. Minimum Base-Steel Thickness: As indicated on Drawings.
  - 5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
    - a. Configuration: hat shaped.

## 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
  - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
  - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C841 that apply to framing installation.
  - 2. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.2 INSTALLATION OF FRAMING SYSTEMS

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
  - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
- E. Direct Furring:
1. Screw to wood framing.
  2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm)o.c.
  2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
  3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

### 3.3 INSTALLATION OF SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

### 3.4 FIELD QUALITY CONTROL

- A. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

## SECTION 092900

### GYPSUM BOARD

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. SECTION INCLUDES
  - 1. Interior partitions
  - 2. Security walls and ceilings.
  - 2. Exterior soffits
  - 3. Exterior walls.

##### 1.2 SUBMITTALS

- A. Product Data: Required
  - 1. Technical Sheet: Indicating manufacturer, product composition, VOC content.
  - 2. Schedule of product locations within product.

##### 1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Applicable code for fire rated assemblies:
  - 1. Partitions: UL Assemblies.
  - 2. Ceiling and soffits: UL Assemblies.
- B. Quality Standards: GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
- C. Performance Requirements- Acoustic Attenuation for Interior Partitions: Meet minimum requirements of USPS Standard Design Criteria.
- D. Security Requirements: USPS Handbook RE-5.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURERS/PRODUCTS

- A. Studs and Tracks: Galvanized sheet steel, 20 gage.
- B. Gypsum Board (Recycled 100% paper backing and 20% core if applicable):
  - 1. Interior partitions: Standard, moisture resistant and fire rated, 5/8 inch thick, with tapered edges.
  - 2. Exterior sheathing: 1/2-inch thick, square edges.
  - 3. Exterior soffit board: 3/4 inch thick, tapered edges.

##### 2.2 ACCESSORIES/MIXES

- A. Acoustical Insulation: Preformed mineral wool, unfaced, 3-1/2 or 6 inch thick.
- B. Corner Beads and Edge Trim: GA 201 and GA 216.
- C. Joint Materials: Reinforcing tape and joint compound.
- D. Fasteners: Type S12 screws.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Metal stud spacing: 24 inches on center.
- B. Metal stud spacing for security walls and ceilings: 8 inches on center.
- C. Wall furring spacing: 24 inches on center.
- D. Fasten gypsum board to furring or framing with screws.
- E. Tape, fill, and sand joints. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.
- F. Stencil ratings on firewalls above ceiling at maximum of 10'-0" on center.

### 3.2 SCHEDULES

- A. Interior Partitions:
  - 1. Metal Studs: Minimum size 3 - 5/8" inch, 20 gage. Design studs based on loading requirements.
  - 2. Gypsum Wall Board:
    - a) Moisture resistant at toilet rooms and wet areas.
    - b) Foil faced in rooms with humidity control.
- B. Wall Furring: 7/8-inch-deep hat shaped furring channels at 24 inches on center, zee - furring and rigid board insulation where required for thermal resistance ratings.
- C. Exterior Walls: Size of metal studs and spacing are to be designed based on loading requirement.

### 3.3 FINISH LEVEL SCHEDULE

- A. Level 1: Above finished ceilings concealed from view.
  - 1. Tape in joint compound at joints and interior angles. Tool marks and ridges acceptable.
- B. Level 2: Utility areas and areas behind cabinetry.
  - 1. Level 1, plus separate coat of compound at joints, angles, fasteners, and accessories. Tool marks and ridges acceptable.
- C. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.
  - 1. Level 1, plus three separate coats of compound at joints, angles, fasteners, and accessories. Compound shall be smooth and free of tool marks and ridges.
- D. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.
  - 1. Level 4, plus separate skim coat of compound over entire surface of gypsum board.

END OF SECTION

USPS MPF Specification

## SECTION 095113

### ACOUSTICAL PANEL CEILINGS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Suspended metal grid ceiling system.
  - 2. Acoustical panels.
  - 3. Perimeter trim.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 210000 - Fire Suppression: Sprinkler heads in ceiling system.
  - 2. Section 233713 - Diffusers Registers and Grilles: Air diffusion devices in ceiling system.
  - 3. Section 265100 - Interior Lighting: Light fixtures attached to ceiling system.

##### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C 635 - Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  - 2. ASTM C 636 - Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
  - 3. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials.
  - 4. ASTM E 580 - Specification for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.

##### 1.3 SYSTEM DESCRIPTION

- A. Design Requirements: Rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

##### 1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for Submittals.
  - 1. Product Data: Metal grid suspension system components and acoustical panel units.
  - 2. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.

##### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this Section with minimum 5 years documented experience.



- B. Regulatory Requirements: Surface Burning Characteristics in Accordance with ASTM E 84 for Class III or C finish:
  - 1. Flame Spread: Less than 200.
  - 2. Smoke Density: Less than 450.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 016000 - Product Requirements Transport, handle, store, and protect products.
- B. Deliver acoustical units in manufacturer's original unopened containers with brand name and type clearly marked.
- C. Store under cover in dry, watertight conditions.
- D. Prior to installation, store acoustical units for 24 hours minimum at same temperature and relative humidity as space where Work will be installed.

## 1.7 PROJECT CONDITIONS

- A. Jobsite Requirements: Maintain uniform temperature range of 60-85 degrees F, and humidity of no more than 70 percent relative humidity prior to, during, and after installation.

## 1.8 MAINTENANCE

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Extra Materials: Provide 1 box of extra acoustical panels for each panel type, pattern, and color to Contracting Officer.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Suspension System: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Armstrong World Industries, Incorporated, Lancaster, PA (800) 448-1405.
  - 2. Chicago Metallic Corporation, Chicago, IL (800) 323-7164.
  - 3. USG Interiors, Chicago, IL (800) 950-3839.
  - 4. Certainteed Ceilings (800) 346-7978
- B. Acoustical Panels: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Armstrong World Industries Incorporated, Lancaster, PA (800) 448-1405.
  - 2. USG Interiors, Chicago, IL (800) 950-3839.
  - 3. Certainteed Ceilings (800) 346-7978
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 SUSPENSION SYSTEM

- A. Products:

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1. Armstrong: Prelude 15/16 inch Exposed Tee System.
2. Chicago Metallic: 1200 System.
3. USG: Donn DX System.
4. Certainteed: Classic Stab CS12-12-15

B. Description:

1. Grid: ASTM C 635, intermediate duty, steel exposed T; nominal 1 inch width; stab-in connections.
2. Recycled content: Minimum 20%
3. Accessories: Stabilizer bars, clips, and splices.
4. Grid Finish: White.
5. Support System: Hot or cold rolled steel channels; galvanized hanger wire, minimum 12 gage.
6. Edge Moldings: Metal channel with exposed flange to match suspension system.
7. Compression Struts: Indicated on Drawings.

## 2.3 ACOUSTICAL PANELS

A. Acoustical Panels (Standard Application):

1. Products:
  - a. Armstrong: Fine Fissured.
  - b. Certainteed :Fine Fissured #HHF-494HNRCX.
  - c. USG: Mars SLT #88785
2. Description:
  - a. Size: 24 x 48 x 3/4 inches
  - b. Texture: Fine Fissured
  - c. Edge: Tegular
  - d. Weight: minimum 1.20 pounds per square foot.
  - e. Surface Finish: Factory-applied vinyl latex paint, perforated, and scored.
  - f. Color: White.
  - g. Recycled Content: Minimum 25%

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
  1. Verify that layout of hangers will not interfere with other Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION - SUSPENSION SYSTEM

- A. Install system in accordance with ASTM C 636 for standard applications, ASTM E 580 for seismic zones, and manufacturer's published instructions.
- B. Provide metal hanger tabs and clips attached to metal deck where required for attachment of suspension wires.

- C. Hang system independent of walls, columns, ducts, pipes, and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
- D. Locate system on room axis according to Reflected Ceiling Plan, where indicated on Drawings, or locate system to a balanced grid design with edge units no less than 50 percent of acoustical panel size where Reflected Ceiling Plan not shown on Drawings
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Do not eccentrically load system or produce rotation of runners.
- F. Install edge molding at intersection of ceiling and vertical surfaces using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions. Secure at 16 inches (41 cm) on center.
- G. Install hold-down clips within five feet of doors. Rivet cross tee's tees at 4 feet on center to edge mould.
- H. **Install compression struts and secure system with tie wires as indicated on Drawings.**
  - 1. **Provide hanger wires, splayed 45 degrees, within 3 inches of intersection between main runner and cross runner.**
  - 2. **Provide compression strut and splayed hanger wires as follows:**
    - a. **One assembly for each light fixture.**
    - b. **Located within 6 feet of wall.**
    - c. **Located at maximum 12 feet on center or as indicated on Drawings.**

### 3.3 INSTALLATION - ACOUSTICAL PANELS

- A. Fit acoustic units in place free from damaged edges or other defects. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.

### 3.4 CONSTRUCTION

- A. Interface with Other Work:
  - 1. Do not install acoustical ceilings until building is enclosed, heating is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
  - 2. Schedule installation of acoustic units after interior wet work is completed.
  - 3. Install after major above ceiling work is complete.
  - 4. Coordinate location of hangers with other Work.
- B. Site Tolerances:
  - 1. Variation from Flat and Level Surface: 1/8 inch in 12 feet.

### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspection.
- B. Inspect acoustical panel placement, ceiling grid suspension system installation and connection to structure.

### 3.6 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:

1. Temporary ventilation: As specified in Section 013543 - Environmental Procedures.
  - a. Ventilate products prior to installation. Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues. Provide a temperature range of 60 degrees F minimum to 90 degree F maximum continuously for minimum 72 hours. Do not ventilate within limits of Work unless otherwise approved by USPS Contracting Officer.

### 3.7 CLEANING

- A. Section 017300 - Execution: Cleaning installed Work.
- B. Clean exposed surfaces of acoustical ceilings including trim, edge moldings, and suspension system members.

END OF SECTION

USPS CSF Specification

SECTION 096501  
RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Resilient tile flooring.
  - 2. Resilient base.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections: Related work specified elsewhere includes but may not be limited to
  - 1. Section 017704 - Closeout Procedures and Training.
  - 2. Section 033000 - Cast-In-Place Concrete.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM F710
  - 2. ASTM F1066
  - 3. ASTM 1869-98 ASTM F2170-02
  - 4. ASTM F2170-02
  - 5. ASTM F2195
- B. Manufacturer's Guides:
  - 1. Armstrong Installation Systems Guide F-5061
  - 2. Mannington Guide for Installation/Maintenance 151209.
  - 3. Johnsonite Installation and Maintenance Instructions 050212.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
- B. Product Data: Data describing physical and performance characteristics; including sizes, patterns and colors including manufacturer's product sheet.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors, patterns, and textures.
- D. Samples: Submit selection and verification samples for finishes, colors, and textures.
- E. Quality Assurance Submittals: Submit the following:
  - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
  - 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.
  - 3. Manufacturer's Instructions: Manufacturer's installation instructions.

- F. Closeout Submittals: Submit the following:
  - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
  - 2. Warranty: Warranty documents specified herein.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this Section with minimum 5 years documented experience.
  - 1. Engage installer certified, as a “manufacturer’s approved mechanic.”
  - 2. Certificate: When requested, submit certificate indicating qualification.
- B. Regulatory Requirements:
  - 1. Critical Radiant Flux in Accordance with ASTM E 684: More than 0.45 Watts per square centimeter.
  - 2. Specific Optical Smoke Density in Accordance with ASTM E 662: Less than 450.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, Handle, Store, and Protect Products.
- B. Ordering: Comply with manufacturer’s ordering instructions and lead time requirements to avoid construction delays.
- C. Deliver tiles and installation accessories to site in original manufacturer’s unopened cartons and containers each bearing names of product and manufacturer, project identification, and shipping and handling instructions.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
  - 1. Material should be stored in areas that are fully enclosed, weathertight with the permanent HVAC system set at a uniform temperature of at least 68 degrees F (20 degrees C) for 72 hrs. prior to and during installation.
  - 2. Store tiles on flat surfaces.

#### 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Jobsite Requirements:
  - 1. Environmental Requirements/Conditions: In accordance with manufacturer’s recommendations, areas to receive flooring shall be clean, fully enclosed, weather tight with the permanent HVAC set at a uniform temperature of at least 68 degrees F. The flooring material should be conditioned in the same manner. Maximum temperature should not exceed 100 degrees F after installation.
  - 2. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.
    - a. Temperature Conditions: 68 degrees F (20 degrees C) for 72 hours prior to, during and after installation.
  - 3. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

## 1.7 SEQUENCING AND SCHEDULING

- A. Finishing Operations: Install tile flooring after finishing operations, including painting and ceiling operations, have been completed.
- B. Concrete Curing: Do not install tile flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by resilient flooring manufacturer's recommended bond, moisture test, and pH test.

## 1.8 WARRANTY

- A. Manufacturer's Warranty: Submit, for USPS's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights USPS may have under Contract Documents.
  - 1. Warranty Period: Five year limited warranty commencing on Date of Substantial Completion.

## 1.9 MAINTENANCE

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Extra Materials:
  - 1. Provide 1 box of extra floor tiles for each tile type, panel, and color.
  - 2. Deliver to USPS extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Tile: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Armstrong World Industries, Lancaster, PA; Representative Contact: Lien Chu (800) 356-9301 ext. 8274.
  - 2. Mannington Commercial, Calhoun, GA (800) 241-2262
  - 3. Johnsonite, Donna Heffernan Sission (703) 250-0714
- B. Wall Base: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Armstrong World Industries, Lancaster, PA (800) 448-1405.
  - 2. Johnsonite, Inc., Chagrin Falls, OH (800)899-8916
  - 3. Roppe Corporation, Fostoria, OH (800)537-9527
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 MATERIALS

- A. Floor Tile
  - 1. Armstrong Excelon VCT, ASTM F1066 Class 2
    - a. Size: 12-inch x 12 inch
    - b. Thickness: 1/8 inch (3.1750 mm)
    - c. Style and Color:

- 1) RFT-1: #51915 Charcoal
- 2) RFT-2: #51904 Sterling
2. Mannington Commercial Essentials - VCT
  - a. Size: 12-inch x 12 inch
  - b. Thickness: 0.080 in (2.0 mm)
  - c. Style and Color:
    - 1) RFT-1: #179 Dark Bark
    - 2) RFT-2: #102 Stone Gray
3. Johnsonite / Tarkett – Azrock Collection - VCT
  - a. Size: 12-inch x 12 inch
  - b. Thickness: 0.080 in (2.0 mm)
  - c. Style and Color:
    - 1) RFT-1: #V228 Peppery
    - 2) RFT-2: #V220 Cast Pewter
4. Armstrong Excelon Imperial Texture - VCT, ASTM F1066 Class 2
  - a. Size: 12-inch x 12 inch
  - b. Thickness: 1/8 inch (3.1750 mm)
  - c. Style and Color:
    - 1) RFT-3: #51903 Blue Gray

- B. Wall Base:
1. Height: 4 inches
  2. Thickness: 1/8 inch.
  3. Coved.
  4. Length: Roll.
  5. Material: Vinyl
  6. Color: Black

### 2.3 ACCESSORIES

- A. Subfloor Filler: Latex underlayment, mixed with undiluted latex liquid furnished by the selected manufacturer.
  1. Underlayment and Patching Compound: Refer to Section 033000 Cast-In-Place Concrete for portland cement based underlayments and patching compounds.
- B. Primers and Adhesives: Waterproof; clear; of types as approved by resilient flooring manufacturer for specific material and substrates encountered. Zero VOC.
- C. Base Accessories: Premolded end stops and internal, and external corners of same material, size, and color as base.
- D. Expansion Joint Covers: Refer to other specification section for expansion joint covers to be used with resilient flooring.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work and are acceptable for product installation in accordance with manufacturer's instructions.



- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.
- E. Material Inspection: In accordance with manufacturer's installation requirements, visually inspect materials prior to installation. Material with visual defects shall not be installed and shall not be considered as a legitimate claim.

### 3.2 PREPARATION

- A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- B. Surface Preparation:
  - 1. General: Prepare floor substrate in accordance with manufacturer's instructions.
  - 2. Floor Substrate: Prepare floor substrate to be smooth, rigid, flat, level, permanently dry, clean and free of foreign materials such as dust, paint, grease, oils, solvent, curing and hardening compounds, sealers, asphalt and old adhesive residue.
  - 3. Concrete Floor Substrate: Concrete floor substrate shall have a minimum compressive strength of 3500 psi. Refer to Division 3 Concrete sections for patching and repairing crack materials, and leveling compounds with Portland cement-based compounds. Do not use or install flooring over gypsum based leveling or patching materials
  - 4. Reference Standard: Comply with ASTM F 710 Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
- C. Concrete Moisture Test:
  - 1. ASTM F1869-98 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Sub floor Using Anhydrous Calcium Chloride: The moisture emission from the concrete shall not exceed 5.0 lbs. per 1000 sq. ft. in 24 hrs (verify using the calcium chloride test as per ASTM F 1869-98). A diagram of the area showing the location and results of each test shall be submitted to the Contracting Officer. If the test results exceed the limitations, the installation shall not proceed until the problem has been corrected.
  - 2. ASTM F2170-02 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. The relative humidity measured from the center of the concrete slab should not exceed 75%. If the test results exceed the limitations, the installation must not proceed until the problem has been corrected.
  - 3. The test area shall be conditioned with the permanent HVAC system set at a uniform temperature of at least 68 degrees F (20 degrees C) for 72 hrs prior to and during testing.
- D. Concrete pH Test: Perform pH tests on concrete floors regardless of the age or grade level. If the pH is greater than 10, it must be neutralized prior to beginning the installation.
- E. Prohibit traffic until filler is cured.
- F. Vacuum clean substrate.

### 3.3 INSTALLATION - TILE FLOORING

- A. Install resilient tile flooring in accordance with manufacturer's published instructions referenced above.
  - 1. Installation environment should be conditioned to a constant temperature and humidity conditions. Site should have permanent windows and doors, fully enclosed, weather tight with

permanent HVAC system (not temporary) set at a uniform temperature of at least 68 degrees F (20 degrees C) for 72 hours prior to, during, and 72 hours after installation.

- B. Open number of floor tile cartons to provide quantity of flooring material required to cover each area; mix tile pieces to ensure shade variations do not occur within any one area.
- C. Spread only enough adhesive to permit installation of floor materials before initial set.
- D. Set flooring in place, press with a 150-pound resilient flooring roller to attain full adhesion.
- E. Lay flooring from center marks established parallel to building walls.
  - 1. Allow minimum 1/2 full size tile width at room or area perimeter.
  - 2. Adjust tile layout as required to avoid use of units less than 1/2 tile.
- F. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar. Where flooring continues through door opening, continue established pattern with no interruption.
- G. Install edge strips at unprotected or exposed edges where flooring terminates.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- I. Extend flooring into toe spaces, door reveals, closets, and similar openings.
- J. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specifications sections for expansion joint covers.
- K. Adhere resilient flooring to flooring substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed flooring installation.
  - 1. Use adhesive applied to substrate in compliance with flooring manufacturer's recommendations, including those for trowel notching, adhesive mixing, and adhesive open and working times.
- L. The specified resilient tiles are factory finished; no finishing is required after installation. Refer to manufacturer's instructions referenced in 1.2B for detailed recommendations for initial and restorative maintenance.
- M. Wait at least 5 days after installation before conducting wet cleaning. Scrub floor with a neutral pH detergent/cleaner.

#### 3.4 INSTALLATION - BASE

- A. Install wall base in accordance with manufacturer's published instructions.
- B. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- C. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- D. Install wall base on solid backing. Bond tight to wall and floor surfaces.
- E. Apply the base to the cabinet toe kicks. If necessary, use a hot air gun to make the base pliable enough to turn the corners of the toe kick. Minimize or eliminate base seams on the toe kick. If the cabinet butts into a wall, start the base where the wall and cabinet meet and continue around the exposed area of the toe kick.

### 3.5 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
  - 1. Temporary ventilation: As specified in Section 013543 - Environmental Procedures.
    - a. Ventilate products prior to installation. Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues. Provide a temperature range of minimum 60 degrees F to maximum 90-degree F continuously for minimum 72 hours. Do not ventilate within limits of Work unless otherwise approved by USPS Contracting Officer.

### 3.6 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspection.
  - 1. Manufacturer's Field Services: Upon USPS's request and with at least 2-3-week notice, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.
- B. Inspect resilient flooring and base installation, pattern, layout, and attachment to substrate.

### 3.7 CLEANING

- A. Section 017300 - Execution: Cleaning installed Work.
- B. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to USPS acceptance. Remove construction debris from project site and legally dispose of debris.
  - 1. Remove visible adhesive and other surface blemishes using cleaning methods recommended by tile floor manufacturer.
  - 2. Sweep and vacuum floor after installation.
  - 3. Do not wash floor until after time period recommended by tile flooring manufacturer.
  - 4. Damp mop tile flooring to remove black marks and soil.

### 3.8 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

END OF SECTION

USPS R&A Specification

## SECTION 099100

### PAINTING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Surface preparation and field application of paints and finishes for interior and exterior surfaces.
  - 2. Schedule of Items to be painted.
  - 3. Exterior painting and finishing schedule.
  - 4. Interior painting and finishing schedule.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections:
  - 1. Section 055000 - Metal fabrications
  - 2. Section 055213 - Pipe and Tube Railings
  - 3. Section 081100 - Metal Doors and Frames: Shop priming.

##### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittals: Procedures for submittals.
  - 1. Product Data: Submit product data for each type of paint specified.
    - a. Technical data sheets indicating manufacturer's catalog number, paint type description, and VOC content.
    - b. Painting Schedule listing surfaces to be painted with cross reference to the specific painting and finishing system and application. Identify each paint material by manufacturer's catalog number and general classification.
  - 2. Samples: Submit color brush-out sample for each paint color and sheen specified.
    - a. Three samples on 8 1/2-inch x 11-inch card stock for color and sheen verification.
    - b. Identify each sample by paint manufacturer, paint type, color, and sheen.
  - 3. Assurance/Control Submittals:
    - a. Test Reports: Submit manufacturer's Safety Data Sheets (SDS) for each paint type proposed.

##### 1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing Work of this Section with minimum five years documented experience.
- B. Regulatory Requirements:
  - 1. Surface Burning Characteristics in Accordance with ASTM E-84 for Class I or A finish:

- a. Flame Spread (Non-Combustible Surfaces): Less than 25.
- b. Smoke Density (Non-Combustible Surfaces): Less than 450.
2. Provide paint and coating materials that conform to Federal, State, and Local restrictions for Volatile Organic Compounds (VOC) content.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and/or reducing.
- C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's published instructions.
- D. Prevent fire hazards and spontaneous combustion.

## 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
  1. Apply paint finishes only when moisture content of surfaces is within manufacturer's acceptable ranges for type of finish being applied.
  2. Surface temperatures or surrounding air temperature to be above 40 degrees F before applying alkyd finishes; above 45 degrees F for interior latex, and 50 degrees F for exterior latex work. Minimum for varnish and transparent finishes is 65 degrees F.
  3. Provide continuous ventilation and heating facilities to maintain temperatures above 45 degrees F for 24 hours prior to, during and 48 hours after application of finishes.
  4. Do not apply paint in areas where dust is being generated.
  5. Provide lighting level in areas being painted of 80-foot candles measured mid-height at substrate surface.

## 1.7 MAINTENANCE

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Extra Materials:
  1. Provide one gallon of each color, type, and sheen to USPS Project Manager.
  2. Label each container with color, type, texture, room locations, in addition to the manufacturer's label.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the work include the following:
  1. Benjamin Moore and Company, Montvale, NJ (201) 573-9600.
  2. PPG Paints, Pittsburgh, PA (800) 441-9695.
  3. Sherwin-Williams Company, Cleveland, OH (800) 321-8194.
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

## 2.2 MATERIALS

### A. Paints:

1. Manufacturer's "Best Grade" for each type specified.
2. Ready-mixed; pigments fully ground maintaining a soft paste consistency, capable of readily and uniformly dispersing to a complete homogeneous mixture.
3. Providing good flowing and brushing properties and be capable of drying or curing free of streaks or sags.
4. VOC limits (g/L) for exterior and interior paint applications:
  - a. Exterior- Steel-Shop Primed
    - 1) Topcoat – Non-Flat: 150
    - 2) Topcoat - Gloss: 250
  - b. Exterior- Steel - Galvanized
    - 1) Primer Coat: 200
    - 2) Topcoat - Non-Flat: 150
    - 3) Topcoat - Gloss: 250
  - c. Interior Wood – Transparent
    - 1) Stain: 250
    - 2) Varnish: 350
  - d. Interior Concrete, Concrete Block
    - 1) Block filler: 300
    - 2) Topcoat – Flat: 100
    - 3) Topcoat – Non-Flat: 150
    - 4) Topcoat – Gloss: 250
  - e. Interior Steel – Unprimed
    - 1) Rust Prime Coat: 400
    - 2) Topcoat – Non-Flat: 150
    - 3) Topcoat – Gloss: 250
  - f. Interior Steel – Primed
    - 1) Topcoat – Flat: 100
    - 2) Topcoat – Non-Flat: 150
    - 3) Topcoat – Gloss: 250
  - g. Interior Steel – Galvanized
    - 1) Topcoat – Non-Flat: 150
    - 2) Topcoat – Gloss: 250
  - h. Interior Plaster, Gypsum Board
    - 1) Undercoater: 200
    - 2) Topcoat - Flat: 100
    - 3) Topcoat – Non-Flat: 150
    - 4) Topcoat – Gloss: 250

B. Primers and Undercoaters: Manufactured by same manufacturer as finish coat materials.

C. Paint Accessory Materials: Linseed oil, shellac, turpentine, and other materials not specifically indicated herein but required to achieve the finishes specified of high quality and approved manufacturer.

## 2.3 EXTERIOR PAINT SYSTEMS

### A. Benjamin Moore:

1. Ferrous Metal: Semi-Gloss, Water Base, Alkyd Primer/Acrylic Latex.
  - a. Primer: V110 Acrylic Metal Primer, 3.5-4.6 mils wet, 1.4-1.9 mils dry.
  - b. Each Finish Coat: V331 Acrylic DTM Enamel Semi-Gloss; 4.6-5.3 mils wet; 1.9-2.3 mils dry.
2. Galvanized Metal: Semi-Gloss, Water Base, Alkyd Primer/Acrylic Latex.
  - a. Primer: V110 Acrylic Metal Primer; 3.5-4.6 mils wet; 1.4-1.9 mils dry.

- b. Each Finish Coat: V331 Acrylic DTM Enamel Semi-Gloss; 4.6-5.3 mils wet; 1.9-2.3 mils dry.
- B. PPG Paints:
  - 1. Ferrous Metal: Semi-Gloss, Water Base, Alkyd Primer/Acrylic Latex.
    - a. Primer: 4020 PF Pitt-Tech Plus DTM Interior/Exterior Primer; MDF 3.0 mils.
    - b. Each Finish Coat: 90-1110 Series Acrylic Enamel Satin; MDF 3.0 mils.
  - 2. Galvanized Metal: Semi-Gloss, Water Base, Alkyd Primer/Acrylic Latex.
    - a. Primer: 4020 PF DTM Interior/Exterior Primer; MDF 3.0 mils.
    - b. Each Finish Coat: 90-1110 Acrylic Enamel Satin; MDF 3.0 mils.
  - 3. Concrete/Masonry Semi-Gloss Acrylic Latex MDF 1.5 mil.
    - a. Primer: 4-22 Perma Crete High Build 100% Acrylic Primer 7.0 mil.
    - b. Each Finish Coat: 4-22 Perma Crete High Build Acrylic Topcoat 1.5 mil.
- C. Sherwin-Williams:
  - 1. Ferrous Metal: Semi-Gloss, Low VOC, Alkyd Primer/Acrylic Latex.
    - a. Primer: Pro-Cryl Universal Water-Based Primer, B66-1310 Series, MDF 3.0 mils.
    - b. Each Finish Coat: DTM Acrylic B66 Series; MDF 3.0 mils.
  - 2. Galvanized Metal: Semi-Gloss, Water Base, Alkyd Primer/Acrylic Latex.
    - a. Primer: Pro-Cryl Universal Water Based Primer, B66-1310 Series, MDF 3.0 mils.
    - b. Each Finish Coat: DTM Acrylic B66 Series; MDF 3.0 mils.
  - 3. Concrete/Masonry Semi-Gloss Acrylic Latex MDF 1.5 mil.
    - a. Primer: Loxon Concrete & Masonry Primer MDF 3.0 mils.
    - b. Each Finish Coat: A-100 Exterior Acrylic, A8 Series MDF 3.0 mils.

## 2.4 INTERIOR PAINT SYSTEMS

- A. Benjamin Moore:
  - 1. Gypsum Board: Eggshell, Water Base, Acrylic Latex.
    - a. Primer: N534 Interior Latex Primer; 4.3 mils wet; 1.4 mils dry.
    - b. Each Finish Coat: Moorecraft Super-Hide Eggshell 286.
  - 2. Masonry: Eggshell, Water Base, Acrylic Latex.
    - a. Primer: 571 Ultra Spec Hi-Build Masonry Block Filler; 16-21 mils wet, 8.5-11.4 mils dry
    - b. Each Finish Coat: 485 Ultra Spec Scuff-X Interior Eggshell; 4.0-4.5 mils wet; 1.6-1.8 mils dry.
  - 3. Metal: Satin, Water Base, Acrylic Latex.
    - a. Each Finish Coat: WH25 Ultra Spec HP DTM Acrylic Low Lustre Enamel; 5.2 mils wet; 2.3 mils dry.
  - 4. Wood: Satin, Water Base, Acrylic Latex.
    - a. Primer: AQ-0400 Aqua Lock Plus 100% Acrylic Primer Sealer; 4.0-5.3 mils wet; 1.6-2.2 mils dry.
    - b. Each Finish Coat: 485 Ultra Spec Scuff-X Interior Eggshell; 4.0-4.5 mils wet; 1.6-1.8 mils dry.
  - 5. Concrete: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer: 571 Ultra Spec Hi-Build Masonry Block Filler, 16-21 mils wet, 8.5-11.4 mils dry.
    - b. Each Finish Coat: 487 Ultra Spec Scuff-X Interior Semi-Gloss Finish, 4.3 mils wet, 1.6 mils dry.
  - 6. Ferrous Metal: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer: V110 Acrylic Metal Primer; 3.5-4.6 mils wet; 1.4-1.9 mils dry.
    - b. Each Finish Coat: 487 Ultra Spec Scuff-X Interior Semi-Gloss Finish, 4.3 mils wet, 1.6 mils dry.
  - 7. Wood Cabinets and Wood Shelves: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Enamel Undercoater: AQ-0400 Aqua Lock Plus 100% Acrylic Primer Sealer; 4.0-5.3 mils wet; 1.6-2.2 mils dry.
    - b. Each Finish Coat: CC-66 Cabinet Coat Trim & Cabinet Enamel Semi-Gloss; 3.6-4.6 mils wet; 1.3-1.6 mils dry.

- B. PPG Paints:
1. Gypsum Board: Eggshell, Water Base, Acrylic Latex.
    - a. Primer: 6-2 Speedhide Latex Sealer; MDF 1.0 mils.
    - b. Each Finish Coat: 6-411 Speedhide Eggshell Latex; MDF 1.5 mils.
  2. Masonry: Eggshell, Water Base, Acrylic Latex.
    - a. Primer: 6-7 Speedhide Block Filler; MDF 10.2 mils.
    - b. Each Finish Coat: 6-411 Speedhide Eggshell Latex; MDF 1.5 mils.
  3. Metal: Satin, Water Base, Acrylic Latex.
    - a. Primer: 4020 PF DTM Waterborne Acrylic Prime MDF 2.2mils.
    - b. Each Finish Coat: 1110 HP Series DTM Acrylic Satin; MDF 1.5 mils.
  4. Wood: Satin, Water Base, Acrylic Latex.
    - a. Primer: 17-921XI 100 Percent Acrylic Universal Primer; MDF 1.5 mils.
    - b. Each Finish Coat: 90-1110 DTM Acrylic Satin; MDF 1.5 mils.
  5. Concrete: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer: 6-7 Speedhide Block Filler; MDF 10.2 mils.
    - b. Each Finish Coat: 6-500 Speedhide Semi-Gloss Latex; MDF 1.2 mils.
  6. Ferrous Metal: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Each Finish Coat: 90-474 DTM Acrylic Satin; MDF 1.5 mils.
  7. Wood Cabinets and Wood Shelves: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer/Sealer: 17-921XI 100 Percent Acrylic Universal Primer; MDF 1.5 mils.
    - b. Each Finish Coat: 90-474 DTM Acrylic Satin; MDF 1.5 mils.
- C. Sherwin Williams:
1. Gypsum Board: Zero VOC, Eg-shell, Water Base, Acrylic Latex.
    - a. Primer: ProMar 200 Zero VOC Primer, B28W2600, MDF 1.0 mils.
    - b. Each Finish Coat: Scuff Tuff Eg-Shel, S24-50 Series MDF 1.6 mils.
  2. Masonry: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer: PrepRite Interior/Exterior Block Filler, B25W25; MDF 3.0 mils.
    - b. Two Finish Coats: ProMar 200 HP Zero VOC Interior Latex Semi-Gloss, B31W1950 Series: MDF 1.5 mils.
  3. Metal: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Each Finish Coat: Pro Industrial DTM Acrylic S-G, B66-1151 Series; MDF 3.0 mils.
  4. Wood: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer: Wall & Wood Primer, B28W08111, MDF 1.6 mils.
    - b. Each Finish Coat: Pro Industrial Waterborne Alkyd Urethane S-G, B53-1150 Series MDF 1.4 mils.
  5. Concrete: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer: Loxon Concrete & Masonry Primer; MDF 10.0 mils.
    - b. Each Finish Coat: Pro Industrial Waterborne Alkyd Urethane S-G B53-1150 Series, MDF 1.4 mils.
  6. Ferrous Metal: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer: Pro-Cryl Universal Water Based Primer, B66-1310 Series, MDF 3.0 mils.
    - b. Each Finish Coat: Pro Industrial DTM Acrylic S-G, B66-01151 Series; MDF 3.0 mils.
  7. Wood Cabinets and Wood Shelves: Semi-Gloss, Water Base, Acrylic Latex.
    - a. Primer/Sealer: Wall & Wood Primer, B2808111, MDF 1.6 mils.
    - b. Each Finish Coat: Pro Industrial Waterborne Alkyd Urethane S-G B53-1150 Series, MDF 1.4 mils.

## 2.5 INTERIOR LEAD ENCAPSULATING COATINGS

- A. Product: Lead encapsulating coating as manufactured by Benjamin Moore.
1. Benjamin Moore: Insl-X Lead Block, Lead Encapsulating Coating, Eggshell EC-3210.
    - a. Base Coat: to be applied over properly prepared substrates of drywall, plaster, wood, masonry, or metal surfaces for walls, trim and ceilings, MDF 14-16 mils wet. Do not use



on surfaces that may be exposed to friction wear. Compatible finish coats may be applied. Prepare and install base coat per manufacturer's recommendations.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
- C. Report in writing to USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 PREPARATION

- A. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, and conditions otherwise detrimental to formation of a durable paint film.
- B. Perform preparation and cleaning procedures in accordance with paint manufacturer's published instructions for each substrate condition.
  - 1. Provide barrier coats over incompatible primers or remove and reprime as required.
  - 2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be painted or provide surface applied protection prior to surface preparation and painting operations. Reinstall all removed items after completion of paint work.
  - 3. Clean surfaces to be painted before applying paint or surface treatment. Remove oil and grease prior to mechanical cleaning.
- C. Ferrous Metals: Clean ferrous surfaces that are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
  - 1. Touch-up shop-applied prime coats, where damaged or bare. Clean and touch-up with same type shop primer.
- D. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum-based solvent. Apply coat of etching primer if required by paint manufacturer.
- E. Cementitious Materials: Prepare cementitious surfaces to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
  - 1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests.
    - a. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct condition before application of paint.
  - 2. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed instructions.
  - 3. Clean floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or another etching cleaner. Flush floor with clean water to neutralize acid and allow to dry before painting.

- F. Wood: Clean wood surfaces to be painted of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes, and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
  - 1. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends faces, undersides, and backsides of such wood, including cabinets and counters.
  - 2. Seal tops, bottoms, and cut-outs with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

### 3.3 APPLICATION

- A. Apply paint products in accordance with manufacturer's published instructions using application procedures approved for the application and substrate to the specified Minimum Dry Film Thickness (MDF). Apply each coat to uniform finish.
- B. Apply each coat slightly darker than preceding coat unless otherwise approved by USPS Project Manager. Sand lightly between coats to achieve specified finish.
- C. Do not apply finishes on surfaces that are not dry.
- D. Number of coats and film thickness required is same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer.
- E. Apply additional coats when undercoats, stains, or other conditions show through final coat until paint film is of uniform finish, color, and appearance. Surfaces, including edges, corners, crevices, welds, and exposed fasteners to receive minimum dry film thickness equivalent to that of flat surfaces.
- F. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate. Provide minimum dry film thickness (MDF) of the entire coating system as indicated in Painting and Finishing Schedule at end of this Section.
- G. Block Fillers: Apply block fillers to concrete masonry units at rate to provide complete coverage with pores filled.
- H. Prime Coats: Before application of finish coats, apply a prime coat of material as recommended by manufacturer to material scheduled to be painted or finished that has not been shop primed. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing.
- I. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, laps, brush marks, runs, sags, or other surface imperfections will not be acceptable.
- J. Hollow Metal Doors: Paint each door edge.
- K. Completed Work: Match USPS Project Manager approved field samples for color and sheen.

### 3.4 MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Clean or replace identification markings on mechanical or electrical equipment when painted over or spattered.

- B. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.
- C. Pre-paint Gas piping prior to installation. (Touch-up paint after installation.)
  - 1. Color:
    - a. Roof (Yellow): OSHA Standard "Safety Yellow."
    - b. Other Areas: Match adjacent surfaces.
- D. At Workroom locations, paint red background on wall and columns behind fire extinguisher extending 6 inches on both sides of the extinguisher and from floor to ceiling, or to 12 feet above floor, whichever is lower. Color is to be OSHA Standard "Safety Red" and in accordance with ANSI Z53.1.

### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Inspect painting and coating application for scheduled material, color, sheen, specified thickness (MDF), and coverage.

### 3.6 CLEANING

- A. As work proceeds and upon completion, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of work keep premises free from any unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
- D. Upon completion of work leave premises neat and clean.

### 3.7 PROTECTION

- A. Protect other surfaces from paint and damage. Repair damage because of inadequate or unsuitable protection.

### 3.8 COLOR SCHEDULE

- A. Any proposal to substitute a color is to include manufacturer's certification that the color matches the specified Munsell notation, or Pantone Color Matching System (PMS) number.
- B. P-1 White (Munsell notation: #5Y 9.25/0.5NN)
  - 1. Benjamin Moore: #968, Dune White.
  - 2. PPG Paints: #512-1, Winter Mood.
  - 3. Sherwin-Williams: #SW 7636, Origami White
- C. P-2 Light Gray (Munsell notation: #N8.0)
  - 1. Benjamin Moore: #1612 Pelican Gray.
  - 2. Sherwin-Williams: #SW 7662, Evening Shadow
- D. P-3 (Not Used)

- E. P-4 Red (Match PMS 485C "Postal Red") Custom Match
- A. P-5 Blue (Match PMS 301C "Postal Blue") Custom Match
- B. P-6 Medium Gray (Munsell notation: #10B7/1)
  - 1. Sherwin Williams: SW#1232, Dublin Gray (custom mix)
- C. P-7 Semi-gloss Black

### 3.9 SCHEDULE OF ITEMS TO BE PAINTED

- A. Painted finishes shall be provided for, all exterior and interior items as described in drawings. All previously painted surfaces to receive new paint.

### 3.10 PAINTING AND FINISHING SCHEDULE

- A. Interior Paint Systems:
  - 1. Interior Gypsum Wallboard:
    - a. 1 coat Latex Wall Primer.
    - b. 1 coat Latex Eggshell Enamel
  - 2. Interior Gypsum Wallboard Painted P-4 and P-5:
    - a. 1 coat Latex Wall Primer
    - b. 5 coats Latex Eggshell Enamel
  - 3. Interior Masonry:
    - a. 1 coat Latex Block Filler
    - b. 1 coat Latex Eggshell Enamel
  - 4. Interior Metal:
    - a. 2 coats Latex Satin
  - 5. Interior Wood (painted):
    - a. 1 coat Enamel Undercoat
    - b. 2 coats Alkyd Semi-Satin Enamel
  - 6. Cast-In-Place Concrete:
    - a. One coat of Latex Masonry Block Filler.
    - b. Two tinted coats of Acrylic Latex Semi-Gloss Enamel.
  - 7. Wood Doors - Painted.
    - a. One coat Enamel Undercoat.
    - b. Two tinted coats of Latex Semi-Gloss Enamel.
  - 8. Ferrous Metals
    - a. Touch up Prime Coat.
    - b. Two tinted coats of Alkyd Enamel Semi-Gloss.
  - 9. Wood Cabinets, Shelves, etc. - exposed surfaces.
    - a. One coat Primer-Sealer.
    - b. One coat Enamel Undercoat.
    - c. One coat Alkyd Enamel Semi-Gloss Enamel.
  - 10. Epoxy Concrete Floor System (VMF Service Bay)
    - a. One coat Primer
    - b. One coat Epoxy 100% solids
    - c. Option One coat Urethane
- B. Exterior Paint Systems:
  - 1. Galvanized Metal:
    - a. Touch up Prime Coat.
    - b. Two tinted coats Exterior Alkyd Enamel Semi-Gloss Enamel.

2. Ferrous Metals:
  - a. Touch up Prime Coat.
  - b. Two tinted coats Exterior Alkyd Enamel Semi-Gloss Enamel.
3. Concrete/Masonry/Stucco
  - a. Prime Coat.
  - b. Two tinted coats Exterior Acrylic Latex Semi-Gloss.

END OF SECTION

USPS MPF Specification

ECTION 101404  
POSTAL SIGNAGE

PART 1 – GENERAL

1.1 SUMMARY

- A. Exterior signage – building identification, directional and parking regulatory signs.
- B. Department of Transportation (DOT) traffic control signs.
- C. Monument signage.

1.2 SUBMITTALS

- A. Product data: Required
- B. Shop drawings: Required

1.3 QUALITY CONTROL

- A. Installer's certification of minimum five years documented experience.
- B. DOT traffic signs shall follow all state and local codes and ordinances.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Exterior Building Signage: Building identification:
  - 1. This Product must be manufactured by a USPS Direct Vendor and is subject to a USPS price and requirements purchasing agreement. The following vendor must be used:
    - a. Gable Signs & Graphics, Inc., 7440 Fort Smallwood Rd, Baltimore, MD 21226, (877) 311-8777, [usps@gablecompany.com](mailto:usps@gablecompany.com).
- B. Exterior Site Signage: Directional and parking regulatory signs:
  - 1. This Product must be manufactured by a USPS Direct Vendor and is subject to a USPS price and requirements purchasing agreement. The following vendor must be used:
    - a. Gable Signs & Graphics, Inc., 7440 Fort Smallwood Rd, Baltimore, MD 21226, (877) 311-8777, [usps@gablecompany.com](mailto:usps@gablecompany.com).
- C. Exterior Monument Signage:
  - 1. This Product must be manufactured by a USPS Direct Vendor and is subject to a USPS price and requirements purchasing agreement. The following vendor must be used:
    - a. Gable Signs & Graphics, Inc., 7440 Fort Smallwood Rd, Baltimore, MD 21226, (877) 311-8777, [usps@gablecompany.com](mailto:usps@gablecompany.com).
- D. DOT Traffic Control Signs:
  - 1. Sign posts shall be galvanized heavy steel hat channels.

2. Sign face background shall be 0.063-inch aluminum plate, cut to size and attached to sign post with non-corrosive 3/8" machine bolts with washers, two per sign.
- E. Interior Signage – Retail signage, Passport signage, etc.:
1. This Product must be manufactured by a USPS Direct Vendor and is subject to a USPS price and requirements purchasing agreement. The following vendor must be used:
    - a. Gable Signs & Graphics, Inc., 7440 Fort Smallwood Rd, Baltimore, MD 21226, (877) 311-8777, [usps@gablecompany.com](mailto:usps@gablecompany.com).

### PART 3 – EXECUTION

- 3.1 Install all products in accordance with manufacturer's guidelines and printed instructions.

END OF SECTION

USPS MPF Specification

## SECTION 101414

### MISCELLANEOUS SIGNAGE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Miscellaneous building signage.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

##### 1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Shop Drawings:
    - a. Indicate sign styles, lettering font, foreground and background colors, locations, and overall dimensions of each sign.
    - b. Setting details for installation in concrete footings.
  - 2. Samples: Submit two sample signs 12 inches (30 cm) x 12 inches (30 cm) in size illustrating type, style, letter font, and colors specified; method of attachment.
  - 3. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.
    - c. Manufacturer's Instructions: Include installation template, attachment devices, and procedures for care of finished surfaces.

##### 1.3 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
  - 2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Deliver materials to project site in manufacturer's original unopened protective packaging.
- C. Identify contents, manufacturer, brand name, thermal values, and applicable standards.
- D. Store in original packaging, off the ground and under protective covers.
- E. Handle to prevent damage.



## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
1. APCO, Atlanta, GA (404) 688-9000.
  2. ASI Sign Systems, Incorporated, Dallas, TX (800) 274 7732.
  3. Gable Signs, Baltimore, MD 21226, Phone (443) 817-0303.
  4. Neokraft Signs, Incorporated, Lewiston, ME (800) 339-2258.
  5. Vomar Products, Incorporated, Van Nuys, CA (800) 521-2737.
  6. 2/90 Sign Systems, Grand Rapids, MI (800) 777-4310.
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 SIGNAGE

- A. Pictographs:
1. AIGA Symbol Signs reproducible art developed for the U.S. Department of Transportation is to be used whenever possible. Room signs shall have 1/32 inch raised one-inch-high Helvetica Medium (upper and lower case) lettering and Braille.
  2. Size: As indicated on drawings.
  3. Material: Plastic.
  4. Color: Use colors below, unless designated by AIGA.
    - a. Foreground (Characters and/or Graphics): White: Match P-1 in Specification Section 099100 Painting.
    - b. Background: Blue: Match P-5 in Specification Section 099100 Painting.
- B. Room and Directional Signage
1. Room signs shall have 1/32 inch raised one-inch-high Helvetica Medium (upper and lower case) lettering and Braille.
  2. Size: 16 inches (40 cm).
  3. Material: Plastic.
  4. Color:
    - a. Foreground (Characters and/or Graphics): White: Match P-1 in Section # 099100, Painting.
    - b. Background: Blue: Match P-5 in Specification Section 099100 Painting.
- C. Egress Signage:
1. When required by public authority, provide signage in one-inch-high Helvetica Medium (upper and lower case) letters, in contrasting color to background to read: "This Door to Remain Unlocked During Business Hours." Doors requiring signage will be indicated on either the hardware schedule or door schedule.
  2. For use above Impact/Traffic doors, which are not an approved means of emergency egress and must be so identified, signs reading "NOT AN EMERGENCY EXIT",
- D. Exit Door Tactile Sign
1. Provide signage to read "Exit" at egress doors. In contrasting color to background, signs shall have 1/32 inch raised one-inch-high Helvetica Medium (upper and lower case) lettering and Braille.
  2. Product: Same as Room and Directional signage.
  3. Size: 6 inch (15 cm)
  4. Color:

- a. Foreground (Characters and/or Graphics): White: Match P-1 in Section 099100 Painting.
  - b. Background: Blue: Match P-5 in Specification Section 099100 Painting.
- E. Dock Door Numbering
- 1. Dock door number signage shall be visible on both interior and exterior side with door in any position.
  - 2. On the exterior, the signs shall be placed in clear view centered on the door above the dock canopy, or wherever they would be the most visible from a distance. The signs shall be a minimum of 16" x 24" with 12" high x 2" thick numbers. Signs shall be reflective with engineered grade reflective white vinyl background with numerals fabricated of translucent vinyl or ink, silk screen or digitally printed postal blue matching P-5 in Specification Section 099100 Painting.
  - 3. On the interior, install door number signs in clear view above any obstructions. Place them on doors if "high-rise doors are installed. In addition, place numbers above doors on wall that will be readable with door in closed position.

### 2.3 FASTENERS AND OTHER MATERIALS

- A. Provide non-corrosive fasteners, hangers, and mounting devices which are compatible with sign material and finish.
- B. Other materials, not specifically described, but required for a complete and proper installation of signs, shall be as selected and subject to approval of the Contracting Officer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
  - 1. Examine foundations, walls, doors, ceilings, and other areas scheduled to receive signs for conditions that would affect quality and execution of work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION

- A. Install signage in accordance with manufacturer's published instructions.
- B. Install sign units and components at the locations shown or scheduled, securely mount with concealed theft-resistant fasteners. Attach signs to substrates in accordance with the manufacturer's instructions.
- C. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces.
- D. Sign manufacturer to provide template for spacing of letters.

3.3 CONSTRUCTION

A. Interface with Other Work:

1. Furnish full-size spacing templates for individually bundled letters and numbers for coordination with work of other trades.

3.4 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Field testing and inspection.

B. Inspect signage locations, attachments, and messages to verify installation conforms to Drawings.

END OF SECTION

USPS MPF Specification

SECTION 102115  
TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Includes:
1. Solid plastic toilet compartments, floor mounted, head rail braced.
  2. Solid plastic urinal screens, wall mounted.
  3. Attachment hardware.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
1. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.
- B. American Society for Testing and Materials (ASTM):
1. ASTM A 167 - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  2. ASTM E-84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
1. Conform to ANSI A117.1 code for access for the handicapped operation of toilet compartment door and hardware.
  2. IBC 2006 for Flame Spread/Smoke Development requirements.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Resource Management:
1. Recycled Content: Provide solid plastic compartments and screens with core manufactured from minimum 50 percent recycled plastic.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
1. Capitol Partitions, Incorporated, Columbia, MD (410) 740-8870.
  2. Comtec Industries, Moosic, PA (717) 348-0997 or (800) 551-6993.
  3. Metpar, Corporation, Westbury, NY (516) 333-2600.
  4. Scranton Products, Scranton, PA (800) 368-5002 or (717) 343-7921.

## 2.2 MATERIALS

- A. Solid plastic compartments and screens: water resistant; graffiti resistant; non-absorbent; with plastic face sheets permanently fused to plastic core.
  - 1. Panels: 1 inch thickness, manufacturers standard height except not less than 55 inches.
  - 2. Doors: 1 inch thickness, manufacturers standard height except not less than 55 inches.
  - 3. Pilasters: 1 inch thickness.
  - 4. Urinal screens: 1 inch thickness, 24 inches in depth, 42 inches in height, wall mounted.
- B. Pilaster Shoes: 3 inches high and one of the following:
  - 1. One piece molded polypropylene or high density polyethylene (HDPE).
  - 2. 20 gage stainless steel.
- C. Attachments:
  - 1. Screws, and Bolts: Stainless steel; tamper proof type.
  - 2. Wall Mounting Brackets: Continuous, full height heavy duty plastic or bight anodized aluminum brackets in accordance with toilet compartment manufacturer's instructions.
- D. Hardware: Chrome plated non-ferrous cast pivot hinges, gravity type, adjustable for door close positioning; nylon bearings; black anodized aluminum door latch; door strike and keeper with rubber bumper; cast alloy chrome plated coat hook and bumper.

## 2.3 FABRICATION

- A. Solid Plastic: 1/4 inch radius beveled edges.
- B. Hardware and Attachments: Pre-drilled by manufacturer; provide for protection of dissimilar metals.
  - 1. Floor Mounted Anchorage: Corrosion-resistant anchoring assemblies with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

## PART 3 – EXECUTION

- 3.1 Install all products in accordance with manufacturer's guidelines and printed instructions.

END OF SECTION

USPS MPF Specification

SECTION 102813  
TOILET ACCESSORIES

PART 1 – GENERAL

1.1 SUMMARY

- A. Toilet accessories.
- B. Mop/broom holder with integral shelf
- C. Urns

1.2 SUBMITTALS

- A. Product Data: Required.
- B. Shop Drawings: Required.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Conform to applicable code for installing work in conformance with USPS Handbook RE-4.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Identified products must be purchased through the Mandatory National Sources Contract for custodial products and are subject to a USPS price and requirements purchasing agreement. The following vendor contracts must be used.
  - 1. Cleanwise, Inc., 1-877-778-8007, FAX 1-877-778-9997
  - 2. W.W. Grainger, Inc., 1-800-GOV-TEAM (1-800-468-8326), FAX 1-877-699-4889
- B. Sources: Bobrick, ASI, or Bradley
  - 1. Stainless Steel: AISI Type 302/304 with polished No. 4 finish.

2.2 SCHEDULE

<b>ITEM</b>	<b>LOCATION</b>
A. Toilet tissue dispenser	One at each water closet. (Available through Mandatory National Sources)
B. Paper towel dispenser	One at each single occupant toilet room and one for every two lavatories. (Available through Mandatory National Sources)
C. Paper towel disposal unit	One for every two lavatories.
D. Napkin dispenser	One at each multi-occupant women's toilet room. (Available through Mandatory National Sources)

- |    |                                      |  |
|----|--------------------------------------|--|
| E. | Napkin disposal                      | One at each women's water closet.                                    |
| F. | Soap dispenser                       | One at each lavatory. (Available through Mandatory National Sources) |
| G. | Grab bars                            | Meet requirements of RE-4.   |
| H. | Mirror (24" x 36" minimum)           | One at each lavatory.  |
| I. | Mirror (18" x 60")                   | One at each multi-occupant toilet room.                              |
| J. | Mop/broom holder with integral shelf | One at each mop basin in custodial closets.                          |
| K. | Large capacity wall mounted urn      | Two at each exterior break area.                                     |
| L. | Toilet seat cover dispenser          | One at each water closet.  |

PART 3 – EXECUTION

- 3.1 Install all products in accordance with manufacturer's guidelines and printed instructions.

END OF SECTION

USPS MPF Specification

SECTION 104400  
FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Fire Extinguishers
- B. Cabinets
- C. Brackets.

1.2 SUBMITTALS

- A. Product Data: Required.
- B. Shop Drawings: Required.

1.3 QUALITY ASSURANCE

- A. Fire Extinguishers shall comply with NFPA 10 "Portable Fire Extinguishers".

PART 2 - PRODUCTS

2.1 MANUFACTURERS/PRODUCTS

- A. Source:
  - 1. Larsen's Manufacturing Company
  - 2. J.L. Industries
  - 3. Potter-Roemer, Inc.
- B. Fire Extinguishers: Multipurpose dry chemical type, cast steel tank, Class ABC, 10-pound minimum capacity. Use of portable fire extinguishers containing CFCs is prohibited.
- C. Cabinets: Recessed mounted, prime painted steel with full glass door.
- D. Brackets: Galvanized steel, white enamel finish.

2.2 SCHEDULES

<u>Location</u>	<u>Extinguishers Type and Mounting</u>
Platform and Workroom.....	Dry Chemical-Bracket
Office Areas and Corridors .....	Dry Chemical-Cabinet
Computer Room .....	Halocarbon Clean Agent-Bracket

PART 3 - EXECUTION

- 3.1 Install all products in accordance with manufacturer's guidelines and printed instructions.

END OF SECTION



## SECTION 105113

### METAL WARDROBE LOCKERS

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Wardrobe locker units with hinged doors.
  - 2. Metal bases and filler panels.
  - 3. Locker room benches.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

##### 1.2 SUBMITTALS

- A. Product Data: Required
- B. Shop Drawings: Required
- C. Samples: Required

#### PART 2 – PRODUCTS

##### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Lockers which may be incorporated in the Work include the following:
  - 1. ASI Storage Solutions, Eastanollee, GA., (706) 827-2710.
  - 2. DeBourgh Manufacturing Company, La Junta, CO, (800) 328-8829.
  - 3. List Industries, Inc., (800) 776-1342.
  - 4. Lyon Metal Products, LLC, Aurora, IL (800) 323-0082.
  - 5. Penco Products, Incorporated, Oaks, PA (800) 562-1000.
  - 6. Republic Storage Systems Company, Canton, OH (800) 477-1255.
- B. Subject to compliance with project requirements, manufacturers offering Locker Room Benches which may be incorporated in the Work include the following:
  - 1. ASI Storage Solutions, Eastanollee, GA., (706) 827-2710.
  - 2. DeBourgh Manufacturing Company, La Junta, CO, (800) 328-8829
  - 3. List Industries, Inc., (800) 776-1342.

##### 2.2 LOCKERS

- C. Type: Double Tier lockers with sloped tops and "Z" type metal base.
- D. Sheet Steel: Commercial grade, mild annealed, cold rolled and stretcher leveled with the following thickness:
  - 1. Body and shelf: Minimum 24 gauge.
  - 2. Door Frames: Minimum 16 gauge:

- 3. Tops and trim: Minimum 18 gauge.
- E. Hinges: Minimum 2 inches high, 0.050 inch thick steel, 4 or 5 knuckles with spun over pin ends.
- F. Fittings:
- G.
  - 1. Recessed locking handles with hasps for USPS-furnished padlocks.
  - 1. One double and three single prong coat hooks.
  - 2. Door numbers with numbers as directed.
  - 3. Rubber bumpers.
- H. Locker Unit Size: 12 inches wide by 15 inches deep by 36 inches high.
- I. Bodies: Formed and flanged.
- J. Door Frames: Formed channel shaped, welded, and ground flush.
- K. Doors: One piece with vertical edges channel shaped, top and bottom, flanged at 90 degree angle, hinges welded to door and bolted to frame and ventilation louvers and top and bottom.
- L. Sloped tops: Continuous with closed ends where exposed.
- M. Bases: 4-inch high solid zee base, 14 gauge. Provide front and closed end where visible.
- N. Fasteners and Anchors: As recommended by locker manufacturer.
- O. Finish:
  - 1. Preparation: Clean, degrease and neutralize.
  - 2. Paint Materials and Application: Powder coat or electrostatically sprayed with heavy coat high quality enamel and baked at 300 degrees Fahrenheit, capable of withstanding hammer test without chipping and flaking.
  - 3. Finish Color: Gray to match specified interior paint finishes.
- P. Padlocks: Supplied by USPS.

### 2.3 LOCKER ROOM BENCHES

- A. Bench Tops: Provide manufacturer's standard one-piece units, of the following material minimum 9-1/2 inches wide by 3/4 inch thick, with rounded corners and edges:
  - 1. Black phenolic core with finish color selected by USPS Project Manager.
- B. Handicap Bench Tops with Seat Back: Provide manufacturer's standard one-piece units, of the following material, 20 to 24 inches deep by 48 inches long by 3/4 inch thick, with rounded corners and edges:
  - 1. Black phenolic core with finish color selected by USPS Project Manager.
- C. Pedestals: Provide manufacturer's standard heavy duty pedestal supports, with predrilled fastener holes, complete with fasteners and anchors, and as follows:
  - 1. Type: Tubular steel, minimum 1-3/4 inch diameter, threaded on both ends, with standard pipe flange at top and bell shaped cast base; baked-enamel finish; floor anchored with concealed fasteners.
  - 2. Color: Match locker units.
  - 3. Pedestal spacing shall be not more than 40 inches and not more than 8 inches from bench end.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- D. Section 017300 - Execution: Verification of existing conditions before starting work.
- E. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
- F. Report in writing to the USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- G. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 PREPARATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication of special components, when possible, to ensure proper fitting of work. However, allow for adjustment and fitting of trim and filler panels whenever taking of field measurements before fabrication might delay Work.

### 3.3 LOCKERS INSTALLATION

- A. Install metal lockers at locations indicated on Drawings in accordance with manufacturer's published instructions.
- B. Install lockers plumb, level, rigid, and flush.
- C. Space fastenings about 48 inches on center, unless otherwise recommended by manufacturer. Install through back-up reinforcing plates where necessary to avoid metal distortion. Conceal fasteners.
- D. Install trim where indicated, use concealed fasteners to provide flush, hairline joints with adjacent surfaces.

### 3.4 BENCH INSTALLATION

- A. Install benches at locations indicated on drawings in accordance with manufacturer's published instructions.
- B. Install benches plumb, level and straight.
- C. Bench quantity: as indicated on drawings.

### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Inspect installation of lockers, benches, attachments, and alignment with adjacent finishes.
- C. Operate locker doors and locking devices.

3.6 ADJUSTING AND CLEANING

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Touch-up marred finishes. Use only materials and procedures recommended or furnished by locker and bench manufacturer. Replace units which cannot be restored to factory-finished appearance.

END OF SECTION

USPS MPF Specification

## SECTION 111300

### LOADING DOCK EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Dock bumpers.
  - 2. Dock seals.
  - 3. Air powered pit type dock levelers.
  - 4. Hydraulic edge-of-dock levelers (flip ramp).
  - 5. Truck restraints with integrated control panel and automatic light communication package.
  - 6. Manual wheel chocks.
  - 7. Dual function, scissors type dock lift/dock leveler.
  
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
  
- C. Related Sections
  - 1. Section 017704 – Closeout Procedures and Training
  - 2. Section 083613 - Sectional Overhead Doors: Coordination of interlock sensor switch.
  - 3. Section 111304 - Scissors Type Dock Lift.
  - 4. Section 265100 – Interior Lighting (LED-Solid State): Type P1, LED Dock Light.

##### 1.2 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI MH29.1 - Safety Requirements for Industrial Scissors Lifts.
  - 2. ANSI MH30.1 - Loading Dock Levelers and Dockboards.
  - 3. ANSI MH30.3 - Vehicle Restraining Device.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Indicate unit dimensions, and details of construction materials and finish, installation details, method of anchorage, roughing-in measurements, and accessories.
  - 2. Shop Drawings: Indicate required opening dimensions, tolerances of opening dimensions, placement dimensions, and perimeter conditions of construction.
  - 3. Assurance/Control Submittals:
    - a. Test Reports: Report from approved Independent Testing Agency indicating compliance of Dock Leveler with requirements of ANSI MH30.1, Scissors Lift with ANSI MH29.1, and Vehicle Restraining Device with ANSI MH30.3.
    - b. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - c. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.
  
- B. Section 017704 – Closeout Procedures and Training: Procedures for closeout submittals.
  - 1. Operating and Maintenance Data: Operating and maintenance instructions and parts lists.

2. Training Manuals: Complete set of all equipment training manuals.
3. Submit written special warranty with forms completed in United States Postal Service name and registered with manufacturer as specified in this section.

#### 1.4 QUALITY ASSURANCE

- A. Dock Levelers: Conform to requirements of ANSI MH30.1.
- B. Scissor Lifts: Conform to requirements of ANSI MH 29.1.
- C. Vehicle Restraining Devices: Conform to requirements of ANSI MH30.3.
- D. Qualifications:
  1. Manufacturer: Company specializing in manufacturing products specified with minimum 20 years documented experience.
  2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.

### PART 2 - PRODUCTS

#### 2.1 DOCK BUMPERS

- A. Dock Bumpers at Dock Leveler Locations:
  1. Laminated rubber, ozone resistant, with two 3/4-inch tie rods and 3/8-inch steel angle at both ends.
  2. Thickness from wall, vertical height, width, and profile of bumpers indicated on Drawings.
  3. Pre-drilled, countersunk mounting holes.
- B. Dock Bumpers at Non-Leveler Locations:
  1. Molded rubber, ozone resistant, nylon or polyester reinforced, minimum Shore A Durometer of 80, tensile strength of 950 to 1050 psi.
  2. Thickness from wall, vertical height, width, and profile of bumpers indicated on Drawings.
  3. Pre-drilled, countersunk mounting holes.
- C. Attachment Hardware: 3/4-inch diameter galvanized bolts and L-shape anchor rods cast into concrete.

#### 2.2 DOCK SEALS

- A. Manufacturers/Models:
  1. Blue Giant: BG-200 Head Curtain Dock Seal.
  2. Chalfant: 101 Curtain Dock Seal.
  3. Kelley: DSH-102-WP4-WF with head curtain.
  4. McGuire: TS103 with head curtain.
  5. Nordock: FP Series with head curtain.
  6. NOVA: FP Series with head curtain.
  7. Pioneer: PF Series with head curtain.
  8. Rite-Hite: Model 1D3C self-locking head curtain.

9. Serco: S-600 Series with head curtain.

B. Components:

1. Fixed Side Pads: 12-inch width, length equal to clear opening height, maximum 12-inch projection, square profile.
2. Fixed Head Pad with Curtains: 24-inch height, length 2 feet longer than clear opening width, maximum 12-inch projection. Head pads accommodate trucks from 12 feet to 13 feet 6 inches.
3. Shelters: Soft-sided dock shelter with flexible side supports and curtains able to withstand trailer impact for dock doors wider than 8 feet.
4. Wear pleats: 12-inch-wide to comply with tear strength and abrasion resistance of Federal Standard 191. Pleats installed at 4-inch spacing.
5. Effective seal for trailers ranging in height from 12 feet to 13 feet 6 inches off pavement, based on door size, dock height, and driveway approach.
6. Pad, shelter and wear pleat fabric to be minimum of 40-ounce vinyl.
7. Fabric color: black.

C. Warranty: Two-year parts and labor

## 2.3 AIR POWERED PIT TYPE DOCK LEVELERS

A. Manufacturers/Models:

1. Blue Giant: AB Series.
2. Kelley: AFX Series, with two maintenance struts.
3. Nordock: AD – USPS, with two maintenance struts.
4. Poweramp: AP Series, with two maintenance struts.
5. Rite Hite: RHA 4002.
6. Serco: AB Model, with two maintenance struts.

B. Description:

1. Operation: Power activated push button through full working range.
2. Deck Width: 6 feet.
3. Deck Length: [8 feet] with additional [16 inch] lip.
4. Operating Range: Minimum 12 inches above to minimum 10 inches below dock level.
5. Capacity: ANSI MH14.1, 1987, Minimum 29,000 pounds.
6. Dock to truck/trailer cycle time: Maximum 30 seconds.
7. Leveler electrical requirements: Coordinate wiring requirements and current characteristics with building electrical and emergency power systems.

C. Operation:

1. When pressure is applied to push button, leveler platform rises pneumatically through a high volume, low pressure industrial fan motor and PVC lifting bag system.
2. Leveler falls slowly to truck bed when button is released.
3. Lever lip automatically extends onto truck and is yieldable.
4. One push button controls both platform and lip operations.

D. Safety Features:

1. Automatic safety device to prevent a drop beyond dock level when leveler is above dock and below dock stops when leveler is below dock level
2. Maintenance struts to withstand 10,000 pounds of fork truck roll-on, capable of accepting OSHA lockout/tagout pad locks with the lockout/tagout instructions prominently displayed in durable fashion, and one of following:
  - a. Two outbound maintenance struts secured to the leveler, to support leveler platform with an additional integral maintenance strut for separate lip support.
  - b. One central maintenance strut supporting both the leveler and the lip for maintenance purposes.
3. Dock safety gate:

- a. Blue Giant: Loading Dock Gate.
- b. Kelley: Dock-Guard Safety Gate.
- c. Nordock: Fall-Stop Safety Barrier Gate.
- d. Rite Hite: Dok-Guardian
- e. Serco: Dock Impact Barrier.

E. Warranty:

- 1. Rated in capacity to match project application, or a minimum of ANSI MH14.1, 1987, and provide a minimum of 10-year parts and labor warranty from the manufacturer on all major structural components such as front hinge assembly, front hinge pins, platform assembly, rear hinges, rear hinge pins, sub frame assembly and working range toe guards.
- 2. Minimum 5-year parts and labor warranty from the manufacturer on all major power activated lifting mechanisms such as air hoses, fittings, motors, lifting bag assembly, etc.

2.4 HYDRAULIC EDGE-OF-DOCK DOCK LEVELERS (FLIP RAMP)

A. Manufacturers/Models:

- 1. Blue Giant: MD-CH Series
- 2. Chalfant: HED 66
- 3. Kelley: KH Series
- 4. McGuire: HED 6620.
- 5. Nordock: EFH – Full Hydraulic
- 6. Rite-Hite: RHE 3 Hydraulic.
- 7. Serco: SH Series.

B. Description:

- 1. Operation: Hydraulic.
- 2. Deck Width: 30 inches.
- 3. Deck Length: 66 inches.
- 4. Operating Range: 5 inches above or below dock level.
- 5. Capacity: 20,000 pounds minimum.
- 6. Toe Guards: Full range.
- 7. Lip: 17 inches.

2.5 TRUCK RESTRAINTS WITH INTEGRATED CONTROL PANEL AND AUTOMATIC LIGHT COMMUNICATION PACKAGE

A. Truck Restraint:

- 1. Manufacturer/Model as Basis for Design: Kelley Star 4 Vehicle Restraint.
- 2. Description: Electrically operated, non-impact, restraint device designed to engage trailer's rear-impact guard and hold truck at loading dock.
- 3. Operation: The restraint is activated and released at inside-mounted integrated control panel. Sensor bar signals contact of hook with the rear impact guard of trailer.
- 4. Restraining Capacity: 32,000 pounds minimum.
- 5. Manufacturer's standard concrete anchor bolts and reinforcing plate for field mounting to concrete dock face.

B. Truck Restraint:

- 1. Manufacturer/Model as Basis for Design: Serco SL60 Ground Mounted Vehicle Restraint.
- 2. Description: Electrically operated, non-impact, ground mounted restraint device designed to engage trailer's rear-impact guard and hold truck at loading dock.
- 3. Operation: The restraint is activated and released at the inside-mounted integrated control panel specified below.
- 4. Restraining Capacity: 32,000 pounds minimum.
- 5. Manufacturer's standard concrete anchor bolts and brackets for ground mounting to concrete apron.



- C. Integrated Control Panel and Automatic Light Communication Package:
1. Manufacturer/Model as Basis for Design: Kelley Master Control Panel and red/green light LED communication system.
  2. Description: Single control panel at each dock position with individual push button operation to control the truck restraint, leveler, and LED dock light, and overhead door. Panel communicates with automatic interior and exterior LED signal lights.
    - a. Panel: NEMA 12, automatic motor starter, thermal overload, 2-amp control breaker with reset capability. All components individually circuit protected.
    - b. Panel Graphics: Clear text and illustrative instructions adjacent to push buttons, and
    - c. Mushroom style "Stop" button that ceases all dock devices when depressed and does not require continuous pressure.
    - d. Selector Switch: Red rotating on/caution switch to maintain caution mode during non-engagement periods.
    - e. Keyed Override: Panel includes removable key override for trucks with damaged or missing ICC bars. In override mode, audible alarm is silenced, outside lights remain red, and inside lights show caution.
    - f. Caution Sign: Single surface-mounted exterior sign with forward facing and reversed letters.
    - g. Signal Lights: Set of illuminated exterior and interior LED signal lights to indicate device's status to both controller and truck driver.
    - h. Alarm: Audible alarm indicating that truck restraint did not engage trailer's rear-impact guard.
  3. Operation:

Equipment	State 1	State 2	Condition Required for State 2
Outside Signal Light	RED	GREEN	State 2: Truck can enter or leave dock position: Truck Restraint in disengaged position. Leveler in neutral position. [Overhead Door fully closed.]
Inside Signal Light	RED	GREEN	State 2: Truck may be loaded or unloaded: Truck Restraint has engaged trailer's rear-impact guard. Leveler lip extended onto truck bed. [Overhead Door fully open.]
Horn	OFF	ON	State 2: Horn sounds: Truck Restraint did not engage trailer's rear-impact guard. Keyed override required.
Leveler	NOT OPERABLE	OPERABLE	State 2: Leveler operates: Truck Restraint has engaged trailer's rear-impact guard. [Overhead Door fully open.]
Truck Restraint	ENGAGED	DISENGAGED	State 2: Truck Restraint has disengaged from trailer's rear-impact guard. Leveler in neutral position. [Overhead Door fully closed.]

## 2.6 MANUAL WHEEL CHOCKS

- A. Fabric-reinforced laminated rubber with handle; two per truck position.
- B. Accessories:
  1. Wall mounted storage bracket; two per truck position.
  2. 15-foot galvanized chain; two per truck position.
  3. Wall mounted sign, "CAUTION – CHOCK WHEELS".

## 2.7 DUAL FUNCTION SCISSORS TYPE DOCK LIFT/DOCK LEVELER

- A. Manufacturers/Models:
  - 1. Rite Hite: Dual-Dok Series.
- B. Description:
  - 1. Stationary single-scissor-type hydraulic dock lift/hydraulic dock lever designed for permanent, recessed, installation in preformed concrete pit.
  - 2. Self-contained electric hydraulic power unit for raising and lowering of the lift, controlled from a remotely located push-button station.
  - 3. Rated lifting capacity for scissors lift operation: ANSI MH14.1, 16,000 pounds minimum.
  - 4. Roll-Over Capacity: 10,000 pounds.
  - 5. Vertical travel for scissors lift operation: Outside pavement to dock level.
  - 6. Operating range for leveler operation: 12 inches above to 20 inches below dock level.
  - 7. Travel Speed: 8 feet per minute up or down.
  - 8. Lowered Height: Maximum 8 inches.
  - 9. Travel alarm with bell volume control.
  - 10. Safety Barrier: At pit perimeter with two permanent sections of rail approximately 4 feet high spanning the length of the pit, and a removable side swing gate, approximately 4 feet high, at the front entry to the pit.
  - 11. Communication Package: Inside and outside communication lights and signs.
  - 12. Front Pit Enclosure: Extends from side to side and automatically extends or contracts with the height of the lift platform.
  - 13. Platform Size: 6 foot 6 inches wide by 10 feet long, excluding 16 inch lip.
- C. Electrical Requirements: Coordinate wiring requirements and current characteristics with building electrical and emergency power systems.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION

- A. Dock bumpers: Install in accordance with manufacturer's instructions. Set square and level.
- B. Dock seals: Install in accordance with manufacturer's instructions. Set square and level.
- C. Signage: Install in accordance with manufacturer's instructions. Set square and level.
- D. Air powered pit type dock levelers: Install unit in prepared opening in accordance with manufacturer's instructions. Set square and level and anchor unit securely.

- E. Hydraulic edge-of-dock levelers (flip ramp): Install unit in prepared opening in accordance with manufacturer's instructions. Set square and level and anchor unit securely.
- F. Truck restraints with integrated control panel and automatic light communication package: Install in accordance with manufacturer's instructions. Set restraint device square and level and anchor securely. Connect control panel wiring with truck restraint, leveler, LED dock light, and overhead door sensor.
- G. Manual wheel chocks: Wall mount storage brackets at each truck position, attach chains to brackets and chocks. Mount signs as directed.
- H. Touch-up all field welds with primer.

### 3.3 ADJUSTING

- A. Adjust all products for smooth and balanced operation.

### 3.4 OPERATING INSTRUCTION

- A. Section 017704 – Closeout Procedures and Training: Procedures for training.
- B. Provide on-site instruction to review the operation of all products and detail any common troubleshooting or maintenance that is required to ensure normal operation.
- C. Provide one complete set of equipment operating, installation, and programming manuals, and warranties that will remain at the installed location.

END OF SECTION

USPS MPF Specification

## SECTION 123216

### MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Fabricated custom cabinets and fixtures.
  - 2. Countertops.
  - 3. Cabinet and fixture hardware.
  - 4. Preparation for installing utilities.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections:
  - 1. Section 011000 - Summary of Work: Requirements for Postal Service furnished Products.
  - 2. Section 123504 - Postal Casework: USPS provided casework

##### 1.2 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard.
  - 2. ANSI A208.1 - Mat Formed Wood Particleboard.
- B. Architectural Woodwork Institute (AWI):
  - 1. AWI AWQS - Architectural Woodwork Quality Standards, 6th Edition Version 1.0.
- C. National Electric Manufacturer's Association (NEMA):
  - 1. NEMA LD3 - High Pressure Decorative Laminates.
- D. United States Department of Commerce Product Standard (PS):
  - 1. PS 1 - Construction and Industrial Plywood.
  - 2. PS 20 - American Softwood Lumber Standard.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
- B. Product Data: Data for hardware and accessories indicating material, type, function, attachment, and finish.
- C. Shop Drawings:
  - 1. Indicate each material used, wood species, component profiles, sections, and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, and schedule of finishes in conformance with requirements of AWI AWQS.
  - 2. Indicate composition of each material and compliance with referenced standards.
  - 3. Keying Schedule: Indicate keying system for cabinet and fixture locks.

4. Present drawings in related and dimensional positions; section details drawn at minimum 1-1/2-inch scale.
- D. Samples: Two 2-inch x 3 inch samples of each plastic laminate finish and color.
- E. Assurance/Control Submittals:
1. Certificate: Manufacturer certificate indicating that Products meet or exceed specified requirements.
  2. Qualification Documentation: Custom cabinetwork and fixture manufacturer and installer documentation of experience indicating compliance with specified qualification requirements.

#### 1.4 QUALITY ASSURANCE

- A. Perform work in accordance with AWI AWQS Custom quality.
1. Affix the AWI Quality Grade Stamp to each unit of custom cabinet and fixture work. The AWI Quality Grade Stamp shall display Custom Grade as specified for each section of Work.
- B. Qualifications:
1. Manufacturer: Company specializing in manufacturing store fixtures specified in this section with minimum five years documented experience. Member in good standing of the Architectural Woodwork Institute.
  2. Installer: Company specializing in performing work of this Section with minimum 5 years documented experience.
- C. Pre-installation Meeting:
1. Convene a pre-installation meeting at Project Site, one week prior to commencing work of this Section.
  2. Require attendance of parties directly affecting work of this Section.
  3. Review preparation and installation procedures and coordinating and scheduling required with related work.
  4. Agenda:
    - a. Tour, inspect, and discuss condition of areas where custom cabinets and fixtures will be installed, and other preparatory work performed by other trades.
    - b. Review custom cabinet and fixture requirements (drawings, specifications, and other contract documents). Identify requirements for Contractor furnished Products.
    - c. Review required submittals, both completed and yet to be completed.
    - d. Review and finalize construction schedule related to custom cabinet and fixture work and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - e. Review requirements for inspections, installation certification, and material usage accounting procedures.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Package fixtures in watertight container for transportation to project site to prevent damage and for storage outside building, if required.
- C. Protect fixtures from damage and excessive or inadequate relative humidity.
- D. Maintain relative humidity between 25 percent and 55 percent.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers who have previously furnished and installed Products specified in this Section include the following:
- B. Thomas Built LLC. 1621 Oconee Street, Athens, GA. 30605 Phone #(706) 850.5215
- C. Specified Structures, INC. 643 Holmes AVE. Barberton, Oh. 44203 Phone #(330) 753.0693
- D. Arrowwoods, 8949 9<sup>th</sup> Street Unit 150, Rancho Cucamonga, CA. 91730 Phone #(909) 476.9288
- E. Alternate Manufacturers:
  - 1. Local millwork manufacturers may be approved by Contracting Officer.
  - 2. Submit documentation indicating local millwork manufacturer has produced millwork of a quality acceptable to United States Postal Service for Projects of similar type to Work of this Contract.
  - 3. Obtain approval from Contracting Officer.

### 2.2 WOOD MATERIALS

- A. Softwood Lumber: PS 20; graded in accordance with AWI Custom; average moisture content of 6 percent.
- B. Hardwood Lumber: NHLA; graded in accordance with AWI Custom; average moisture content of 6 percent.

### 2.3 PANEL MATERIALS

- A. Softwood Plywood: PS 1; graded in accordance with AWI, core materials of particleboard.
- B. Hardwood Plywood: PS 51; graded in accordance with AWI, core materials of particleboard, type of glue recommended for application.
- C. Wood Particleboard: PS1; AWI standard, composed of wood chips, medium density, made with water resistant adhesive; of grade to suit application; sanded faces.
- D. Hardboard: ANSI A135.4; Pressed wood fiber with resin binder, tempered grade, smooth two sides

### 2.4 PLASTIC LAMINATE AND OTHER FINISH MATERIALS

- A. Manufacturers: Subject to compliance with project requirements provide plastic laminates and other finish materials of one of the following:
  - 1. Formica Corporation.
  - 2. Micarta Corporation.
  - 3. Nevamar Corporation.
  - 4. Wilsonart International.
  - 5. Pionite.
  - 6. Samsung.
  - 7. Forbo.

- B. High-Pressure Decorative Laminate: NEMA LD3, GP-50 General Purpose .050 inch.
- C. Low Pressure Laminate: Melamine thermo set decorative overlay.

## 2.5 COLOR SCHEDULE

- A. PL-1 White
  - 1. Nevamar, #S-7-27T, Smokey White, textured.
  - 2. Formica, #933, Mission White
  - 3. Micarta, #90M92, Dover White
  - 4. Pionite, #SW806, Carnation White
  - 5. Wilsonart, #1573-60, Frosty White
- B. PL-2 Red
  - 1. Formica #839-58, Stop Red
- C. PL-3 Blue
  - 1. Formica #914-58, Marine Blue
- D. PL-4 Gray
  - 1. Wilsonart #4142-60, Gray Glace
- E. PL-5 Countertop
  - 1. Forbo, Walton, UNI #186, Lead
- F. S-1 Solid Surfacing
  - 1.0 Samsung Staron, Solid Bright White

## 2.6 ACCESSORIES

- A. Adhesive: Type recommended by AWI to suit application.
- B. Plastic Edge Trim: Extruded flat shaped; smooth finish; self-locking serrated tongue; of width to match component thickness.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Grommets: Metal material for cut-outs.

## 2.7 HARDWARE

- A. 3" wire pulls
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

## 2.8 FABRICATION

- A. Fabricate cabinets and fixtures to AWI AWQS, Section 400 - Architectural Cabinets, Custom Grade Standards.
- B. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- C. Fit shelves, doors, and exposed edges with matching plastic edging. Use one piece for full length only.
- D. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Door and Drawer Fronts: -Flush
- F. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- G. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.
- H. Mechanically fasten back splash to countertops with steel brackets at 16 inches on center.
- I. Provide cutouts for inserts, appliances, outlet boxes, fixtures, and fittings. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
  - 1. Verify custom cabinet and fixture dimensions by field dimensions.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

#### 3.2 INSTALLATION

- A. Install custom fabricated cabinets and fixtures in conformance with AWI AWQS, Section 1700 - Installation of Woodwork.
- B. Set and secure fixtures in place; rigid, plumb, and level at locations indicated on Drawings.
  - 1. Attach to floor or walls with fasteners as indicated on Drawings.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Carefully scribe fixtures abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure fixtures to floor using appropriate angles and anchorages.



- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood, finish flush with surrounding surfaces.

### 3.3 CONSTRUCTION

- A. Interface with Other Work:
  - 1. Coordinate installation sequence of fixtures with trades providing data and communication connections to fixtures.
- B. Site Tolerances:
  - 1. Maximum Variation from True Position: 1/16 inch.
  - 2. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

### 3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Inspection procedures.
- B. Contracting Officer will inspect custom cabinet and fixture installation, alignment, attachment to structure, and connection to data and communication lines.

### 3.5 ADJUSTING

- A. Adjust moving or operating parts to function smoothly and correctly.

### 3.6 CLEANING AND PROTECTION

- A. Section 017300 - Execution Cleaning and protection of installed Work.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

USPS MPF Specification

SECTION 210000  
FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire Protection Basic Materials and Methods:
  - a. Hangers and Supports.
  - b. Pipe and Fittings.
  - c. Piping Specialties.
  - d. Valves.
2. Wet-Pipe Fire Suppression Sprinklers:
  - a. System design, installation, and certification.
  - b. Fire department connections.
3. Dry-Pipe Fire Suppression Sprinklers:
  - a. System design, installation, and certification.
  - b. Fire department connections.
4. Fire Pumps:
  - a. Fire pump package.
  - b. Fire pump motor.
  - c. Electric jockey pump.
  - d. Controllers.

B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

C. Related Sections:

1. Section 312300 - Excavation and Fill: Earthwork for utilities.
2. Section 331100 - Water Utility Distribution Piping: Fire protection water system.
3. Section 283100 - Fire Detection and Alarm: Interconnection of systems.

1.2 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, and 250.
2. ANSI B 16.3 - Malleable-Iron Threaded Fittings, Class 150 and 300.
3. ANSI B 16.4 - Gray Iron Threaded Fittings.
4. ANSI A 21.10 - Ductile Iron and Gray Iron Fittings, 2 in. through 48 in., for Water and Other Liquids.
5. ANSI A 21.51 - Ductile-Iron Pipe, Centrifugally Cast.

B. American Society of Mechanical Engineers (ASME):

1. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
2. ASME B16.3 - Malleable Iron Threaded Fittings.
3. ASME B16.4 - Gray Iron Threaded Fittings.
4. ASME B16.5 - Pipe Flanges and Flanged Fittings.
5. ASME B16.9 - Factory-made Wrought Steel Buttwelding Fittings.
6. ASME B16.25 - Buttwelding Ends.
7. ASME Sec 9 - Welding and Brazing Qualifications.

C. American Society of Sanitary Engineering (ASSE);

1. ASSE 1047 - Reduced Pressure Detector Assembly Backflow Preventer.
  2. ASSE 1048 - Double Check Detector Assembly Backflow Preventer.
  - 3.
- D. American Society for Testing and Materials (ASTM):
1. ASTM A 53 - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  2. ASTM A 47 - Specification for Malleable Iron Castings.
  3. ASTM A 135 - Specification for Electric-Resistance-Welded Steel Pipe.
  4. ASTM A 234 - Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
  5. ASTM A 795 - Specification for Black and Hot-dipped Zinc-coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
- E. Factory Mutual (FM):
1. FM - Approval Guide, 2023 Edition.
  2. FM Data Sheet 2-8N, 2023 Edition.
- F. National Fire Protection Association (NFPA):
1. NFPA 13, 2022 Edition - Installation of Sprinkler Systems.
  2. NFPA 20, 2022 Edition - Standard for the Installation of Stationary Pumps for Fire Protection.
  3. NFPA 24, 2022 Edition – Standard for the Installation of Private Fire Service Mains and Their Appurtenances
  4. NFPA 70, 2023 Edition - National Electrical Code.
  5. NFPA 72, 2022 Edition - National Fire Alarm Code.
  6. NFPA 291, 2022 Edition – Recommended Practice for Fire Flow Testing and Marking of Hydrants.
- G. Underwriters Laboratories, Inc. (UL):
1. UL Fire Directory B, Product Directory - Fire Protection Equipment Directory, 2023 Edition.
  2. UL 193 - Alarm Valves for Fire Protection Service.
  3. UL 199 - Automatic Sprinklers for Fire Protection Service.
  4. UL 346 - Water Flow Indicators for Fire Protective Signaling Systems.
  5. UL 405 - Standard for Fire Department Connections.
  6. UL 753 - Alarm Accessories for Automatic Water Supply Control Valves for Fire Protection Service.
  7. UL 668 - Hose Valves for Fire Protection Services.
  8. UL 448 - Pumps for Fire Protection Service.
  9. UL 1247 - Diesel Engines for Driving Centrifugal Fire Pumps.
  10. UL 1468 - Direct-Acting Pressure Reducing and Pressure-Control Valves for Fire Protection Service.
  11. UL 1478 - Fire Pump Relief Valves.

### 1.3 DEFINITIONS

- A. Authority Having Jurisdiction: See Public Authorities.
- B. Delegated Engineer: A Professional Engineer Registered in the State where the project is located who undertakes final design of the fire protection system.
- C. Owner: Any designated representative of the owner.
- D. Professional of Record: Architect or Engineer of Record indicated on the Contract Documents.
- E. Public Authorities: Local, State or Federal government body having jurisdiction over any portion of the project. This includes, but is not limited to building departments, Fire Departments, Fire Marshals

Offices, Water Departments, Insurance Regulatory Boards, Utility Companies or Districts, Cross Connection Control Departments, Transportation Departments, etc.

#### 1.4 SYSTEM DESCRIPTION

##### A. Design Requirements:

1. System to provide coverage for entire building.
  2. Retail Areas, Canopies, Workroom and General Storage areas.
    - a. Density: 0.20 gpm/ft<sup>2</sup> for most hydraulically remote 1500 ft<sup>2</sup>, with 250 gpm hose stream allowance. If Area is less than 1500 ft<sup>2</sup>, calculate at 0.20 gpm/ft<sup>2</sup> for entire area with 250 gpm hose stream allowance.
    - b. Sprinkler Temperature Rating: Ordinary. High in combustible concealed spaces or near heat producing equipment.
    - c. Spacing: 130 ft<sup>2</sup> per sprinkler maximum.
    - d. Occupancy: Mercantile, Ordinary Hazard Group 2 per NFPA 13.
  3. Office Areas and Restrooms
    - a. Density: 0.10 gpm/ft<sup>2</sup> for most hydraulically remote 1500 ft<sup>2</sup>, with 100 gpm hose stream allowance. If area is less than 1500 ft<sup>2</sup>, calculate at 0.10 gpm/ft<sup>2</sup> for entire area with 100 gpm hose stream allowance.
    - b. Sprinkler Temperature Rating: Ordinary. High near heat producing equipment.
    - c. Spacing: 225 ft<sup>2</sup> per sprinkler maximum, 15 feet spacing maximum.
    - d. Occupancy: Light Hazard per NFPA 13.
  4. Combustible Concealed Spaces
    - a. Density: 0.10 gpm/ft<sup>2</sup> for most hydraulically remote 1500 ft<sup>2</sup>, with 100 gpm hose stream allowance. If area is less than 1500 ft<sup>2</sup>, calculate at 0.10 gpm/ft<sup>2</sup> for entire area with 100 gpm hose stream allowance.
    - b. Sprinkler Temperature rating: Intermediate. High near heat producing equipment.
    - c. Spacing: 130 ft<sup>2</sup> per sprinkler maximum, 15 feet spacing maximum.
    - d. Occupancy: Light Hazard per NFPA 13.
  5. Design sprinkler systems using the following **water and fire pump supply per hydrant flow test**.
  6. The Delegated Engineer shall perform a water flow test to determine the available water supply for fire protection system design. The following parameters shall be followed in conducting the water flow test:
    - a. Conduct flow test in accordance with NFPA 291. Coordinate flow tests validity with Public Authorities and Contracting Officer.
    - b. Contact the Public Authorities before conducting the flow test. Public Authority appointed representative must be present during the flow test.
    - c. Conduct a water flow pressure test as close to the proposed location as practical. The water flow pressure test shall consist of three separate pressure tests conducted at the same location. The first water flow pressure test shall be conducted at zero flow (initial static condition). The second water flow pressure test shall be conducted flowing at or more than **700** gpm (residual condition). The final water flow pressure test (final static condition) shall be conducted immediately following the second at zero flow, to determine if pumps or other pressure/flow modifying devices may have been engaged. Conduct test during peak hour demand conditions. If test cannot be conducted during peak hour, adjust
  7. Safety Factor: 10 percent of static and residual PSI.
  8. Hydraulic calculation areas of application shall be based on actual floor area protected by sprinklers. Use 1.2 multiplied by the square root of the area for design criteria.
  9. Hydraulic calculations for all dry pipe system piping shall be based on a C Value of 100.
  10. System control valve shall be a post indicating valve located a minimum of 40 feet from building.
- ##### B. Scope of Work: Design, fabrication, and installation of Fire Protection System Including the Following:
1. Complete fire protection system as outlined in these Contract Documents, including all labor, materials, shop drawings and hydraulic needed to furnish and install a complete and functional fire protection system. System shall comply with NFPA 13, Public Authorities, Contracting Officer and Contract Documents.
  2. Visit site to determine conditions and extent of work.

3. Coordination of work with Contract Documents and all trades, including building design loads.
4. The work under this section shall yield to all other trades.
5. Warranty on new materials and labor.
6. Provide all necessary permits, taxes, and fees, including Public Authorities inspection and testing fees necessary to complete the specified work.
7. Provide any required core drilling of walls, and required UL listed, non-combustible firestopping materials at all new sprinkler piping penetrations. Patch as required. New piping penetrations shall be adequately firestopped to maintain the fire resistance rating required.
8. Access panels for service and access to valves in enclosed ceiling and walls.
9. Provide coordination and interface of alarm initiating and supervisory devices with the fire alarm system.
10. The fire protection piping, and sprinkler layout shall function in such a manner so as not to interfere with lighting fixtures, air distribution devices, equipment, piping, beams, and ductwork. The work under this section shall yield to all other trades.
11. Furnish, install, and adjust as necessary all waterflow and valve supervisory switches.
12. Fire protection systems complete with supervised control valves, inspector's test and main drain assemblies, vane type waterflow alarm switches, pressure gauge, main drain, auxiliary drains, and local alarm devices.
13. Provide required signs at all new control valves, main drains, auxiliary drains and inspector's test connections, hydraulic placards, etc.
14. System testing.
15. Underground pipe modifications, including all necessary fittings, clamps, thrust blocking, backflow preventers, excavating and backfilling, etc.
16. Fire department connection with check valve and ball drip, including interconnecting supply piping to sprinkler riser.
17. If sprinkler system in any area is subject to freezing, then use non-freeze system (dry or anti-freeze).
18. Drawings must indicate specific method of freeze protection for all areas.
19. If necessary, Contractor shall furnish and install one UL Listed and or FM Approved **electric motor**] driven horizontal split case fire pump. Each unit shall include a pump, base, coupling, coupling guard, necessary fittings, and an automatic controller.
20. The fire pump shall be rated at:
  - a. Pump Capacity: **1500** gpm at **40** psi. to be verified by fire protection engineer.
  - b. The net pump shutoff (churn) pressure plus the maximum static suction pressure, adjusted for elevation, shall not exceed the pressure for which the system components are rated.
  - c. Maximum permissible pump speed shall not exceed **2100** rpm.
  - d. Maximum permissible **motor** speed shall not exceed **2100** rpm.
  - e. Maximum permissible **motor** horse power shall not exceed 50 hp.
  - f. Static suction pressure available: **verify per hydrant flow and pressure test**
  - g. Suction pressure at rated gpm: **verify per hydrant flow and pressure test**
  - h. Suction pressure at 150 percent rated gpm **verify per hydrant flow and pressure test**
  - i. Maximum permissible static pressure on discharge flange of pump (including maximum static suction and maximum churn pressure): **150** psi.
  - j. Unit shall be designed to deliver not less than 150 percent of rated capacity at 65 percent of rated capacity.
  - k. Ambient temperature range: **125** degrees F maximum to **40** degrees F minimum.
  - l. Pump start: At a minimum operating design pressure of **130** psi
  - m. Maximum demand: Shall not exceed 120 percent of pump's rated capacity.
  - n. Pump: Supplied from **public water main**.
21. Performance of Jockey Pump on Fire Pump System:
  - a. Maximum permissible pump churn pressure shall not exceed **120** percent of rated pressure (**120** psi maximum)
  - b. Motor: **1.5** hp.
22. If fire pump is necessary, all equipment furnished, and the complete installation of the fire pump shall be in accordance with NFPA 20. Pumps and controllers shall be UL Listed and or FM Approved.
  - a. Assembled pump configuration must be installed per manufacturer's recommendations.
  - b. Purchase pumps, driver, controllers, and accessories under unit contract.

- c. Provide pump suction control valve.

## 1.5 SUBMITTALS

### A. Section 013300 - Submittal Procedures: Procedures for Submittals.

1. Product Data:
  - a. Sprinkler heads, valves, and specialties.
  - b. Performance ratings rough-in details, weights, support requirements, and piping connections.
2. Preliminary Shop Drawings: Prior to detailed submission, submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation.
3. Shop Drawings: Indicate hydraulic calculations, detailed pipe layout, hangers and supports, components and accessories. Indicate system controls. Prior to commencement of installation, submit licensed Professional Engineer's sprinkler system drawings (signed and sealed by Delegated Engineer) specified in "Quality Assurance" Article to Designated Reviewers. Include system hydraulic calculations and equipment data. Submittals shall be complete and in bound sets.
4. Sprinkler system drawings, prepared according to NFPA 13 and FM 2-8N and Contract Documents. Submittals shall be made to Designated reviewers. Designated Reviewers are:
  - a. Additional Submittal: Submit shop drawings, product data, and hydraulic calculations to Public Authorities for approval. Submit proof of approval to Contracting Officer.
  - b. Submittals to Contracting Officer:
  - c. Submittals to **Fire Protection Engineer and Professional** of Record:
5. Assurance/Control Submittals:
  - a. Design Data:
  - b. Test Reports: Submit the following reports directly to Contracting Officer from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.
    - 1) Pre-test.
    - 2) Acceptance test.
  - c. Certificates: Manufacturer's certificate certifying that components and Products meet or exceed specified requirements.
  - d. Qualification Documentation:
    - 1) Submit documentation of manufacturer and installer experience indicating compliance with specified qualification requirements. Include lists of completed projects with project names and addresses, and names of Engineers and Contracting Officers.
    - 2) Fire protection contractor license issued by State or local authority having jurisdiction.
  - e. Manufacturer's Field Reports: Submit the following reports directly to Contracting Officer from Manufacturer's Quality Control Inspector, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.
    - 1) Preparatory inspection.
    - 2) Initial inspection.
    - 3) Follow-up inspection.
    - 4) Final inspection.

### B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.

1. Project Record Documents: Accurately record the following.
  - a. Sprinklers and deviations of piping from Drawings.
  - b. Drain and test locations.
2. Operation and Maintenance Data:
  - a. Components of system, servicing requirements, inspection data, replacement part numbers and availability, and location and numbers of service depot.

## 1.6 QUALITY ASSURANCE

### A. Qualifications:

1. Manufacturer: Company specializing in manufacturing the Products specified in this Section, whose equipment, specialties, and accessories are listed by product name and manufacturer in UL Fire Protection Equipment Directory and FM Approval Guide and that conform to other requirements indicated.
2. Installer: Company specializing in performing the Work of this Section with minimum of 3 years documented experience and approved by Public Authorities in the State and Jurisdiction where the project is located. Company qualified to install and alter fire protection piping, equipment, specialties, and accessories, and repair and service equipment. Company familiar with, and in compliance with, requirements of authorities having jurisdiction.
3. Delegated Engineer: Design fire protection system, develop working plans and shop drawings, and perform shop and site work under direct supervision of a Delegated Engineer experienced in design of this work and licensed in the State where the Project is located.

- B. If a fire pump is required, the manufacturer shall provide the services of a qualified Field Engineer to assist in the proper installation of equipment, make necessary mechanical adjustments, and align fire pump flexible coupling. Arrange, conduct and provide all required test equipment for Field Acceptance Test. Test shall be witnessed by the Public Authorities and Contracting Officer.

### C. Regulatory Requirements:

1. Perform Work in accordance with NFPA 13, 20, 24, 70, 72 and 291.
2. Equipment and Components: UL listed and FM approved with appropriate label or marking.
3. Hydraulic Calculations, Product Data, Shop Drawings: Bear stamp of approval of Public Authorities.
4. Welding Materials and Procedures: Conform to AWS D10.9.
5. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.
6. Comply with requirements of Public Authorities for submittals, approvals, materials, hose threads, installation, inspections, and testing.
7. Comply with requirements of Contracting Officer and Owner's insurance underwriter for submittals, approvals, materials, installation, inspections, and testing.
8. Provide certificate of compliance from Public Authorities indicating approval of field acceptance tests.
9. Conform to applicable code for submission of design and calculations, reviewed shop and erection drawings and as required for acquiring permits.
10. Cooperate with regulatory agency or authority and provide data as requested.

### D. Pre-Installation Meetings:

1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
2. Require attendance of parties directly affecting Work of this Section.
3. Review conditions of operations, procedures and coordination with related Work.
4. Agenda:
  - a. Tour, inspect, and discuss conditions of building and building structure.
  - b. Review fire sprinkler system design and requirements.
  - c. Review required submittals, both completed and yet to be completed.
  - d. Review fire protection system Drawings and data.
  - e. Review and finalize construction schedule related to fire sprinkler system and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
  - f. Review required inspections, testing, certifying, and material usage accounting procedures.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.

- B. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.
- C. Deliver and store valves in shipping containers, with labeling in place.
- D. Provide temporary protective coating on cast iron and steel valves.
- E. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

## 1.8 MAINTENANCE

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Extra Products: At completion of installation, deliver to Contracting Officer.
  - 1. Provide extra sprinklers under provision of NFPA 13.
  - 2. Provide suitable wrenches for each head type.
  - 3. Provide metal storage cabinet in location designated. Cabinet to be of sufficient size to store sprinklers, wrenches, and copy of all fire protection submittal documents.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Ames Company, Incorporated, Woodland, CA (530) 666-2493.
  - 2. Cla-Val Company, Costa Mesa, CA, (800) 942-6326.
  - 3. Febco, Fresno, CA, (209) 252-0791.
  - 4. The Viking Corporation, Hastings, MI (800) 968-9501.
  - 5. Watts Industries, North Andover, MA (978) 688-1811.
  - 6. Wilkins Regulator Division, Zurn Industries, Incorporated, Erie, PA (814) 455-0921.
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 FIRE PROTECTION PIPING - BELOW GROUND

- A. Cast Iron Pipe: Class 200, with flanged joints, ASA 21.2 or bell and spigot ASA 21.6. Cement-mortar lined, ASA 21.4.
  - 1. Fittings: Cast Iron Flanged, ASA B16.1 Class 125; bell and spigot ASA 21.10; fittings to be cement mortar lined ASA21.4.
- B. Ductile Iron Pipe: Class 50
- C. Indicator Posts:
  - 1. No. A-20805, with tamper switch (double contact), by Mueller.
  - 2. Substitutions: Under provisions of Section 016000.
- D. Gate Valves: AWWA C500-59T.

### 2.3 FIRE PROTECTION PIPING - ABOVE GROUND



- A. Black Steel Pipe: ANSI/ASTM A53; ASTM A795; ASTM A135; ANSI B36.10M; Schedule 10 or 40 (Schedule 30 for 8 inch pipe and larger).
  - 1. Steel Fittings: ANSI/ASME B16.9, wrought steel, butt welded; ANSI/ASME B16.25, battled ends; ASTM A234, wrought carbon steel and alloy steel; ANSI/ASME B16.5, steel flanges and fittings; ANSI/ASME B16.11, forged steel socket welded and threaded.
  - 2. Cast Iron Fittings: ANSI/ASME B16.1, flanges and fittings; ANSI/ASME B16.4, screwed fittings.
  - 3. Malleable Iron Fittings: ANSI/ASME B16.3, screwed type. ANSI/ASTM A47.
  - 4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped composition sealing gasket, steel bolts, nuts, and washers; Victaulic FlushSeal gasket required for dry pipe, preaction and double interlock dry systems.
  - 5. Fitting type to match pipe. Galvanized required for dry pipe systems.
- B. Alternate Products: Acceptable alternatives to Schedule 10 and Schedule 40 pipe.
  - 1. "Superflow" Non-threadable Lightwall, by Allied.
  - 2. "Dyna-Flow" Non-threadable Lightwall, by American Tube.
  - 3. Schedule 5 pipe used with Victaulic "Pressfit" system.
  - 4. "Eddylite," by Bullmoose.
  - 5. Flexible sprinkler system assembly by SprinkFLEX, for the final connection between the branch line and the sprinkler head.
- C. Pipe must meet the following conditions:
  - 1. Threads: Shop cut according to applicable ANSI standards.
  - 2. Pipe Fittings: Specifically rated for use with pipe.

## 2.4 BACKFLOW PREVENTER

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Ames Company, Incorporated, Woodland, CA (530) 666-2493.
  - 2. Cla-Val Company, Costa Mesa, CA, (800) 942-6326.
  - 3. Febco, Fresno, CA, (209) 252-0791.
  - 4. The Viking Corporation, Hastings, MI (800) 968-9501.
  - 5. Watts Industries, North Andover, MA (978) 688-1811.
  - 6. Wilkins Regulator Division, Zurn Industries, Incorporated, Erie, PA (814) 455-0921.
  - 7. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. ASSE standard type, size, maximum flow rate, and maximum pressure loss as indicated on Drawings. Bronze, cast-iron, steel, or stainless-steel body, corrosion-resistant interior components, FDA-approved epoxy coating for cast-iron or steel body, 150 psig working pressure.
- C. Double-Check Backflow Prevention Assemblies: ASSE 1015, consisting of shutoff valves on inlet and outlet and strainer on inlet with test cocks and two positive-seating check valves.

## 2.5 GATE VALVES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Grinnell Supply Sales, Company, Grinnell Corporation.
  - 2. Nibco, Incorporated.
  - 3. Stockham Valves and Fittings, Incorporated.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

- B. Gate Valves (Up to and including 2 inches): Bronze body, bronze trim, rising stem, handwheel, inside screw, single wedge or disc, solder or threaded ends.
- C. Gate Valves(Over 2 inches): Iron body, bronze trim, rising stem, handwheel, OS&Y, single wedge, flanged ends.

## 2.6 GLOBE OR ANGLE VALVES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
  2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
  3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Up to 2 inches: Bronze body, bronze trim, rising stem and handwheel, inside screw, renewable composition disc, solder or screwed ends, with backseating capacity.
- C. Over 2 inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, plug-type disc, flanged ends, renewable seat and disc.

## 2.7 BUTTERFLY VALVES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
  2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
  3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Cast or ductile iron body; chrome plated ductile iron disc, resilient replaceable EPDM seat; wafer, lug, or grooved ends; extended neck; handwheel and gear drive and integral indicating device; built-in tamper proof switch.

## 2.8 CHECK VALVES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
  2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
  3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Up to and including 2 inches: Bronze swing disc, solder or screwed ends.
- C. Over 2 inches: Iron body, bronze trim, stainless steel spring, renewable composition disc, screwed, wafer, flanged, or grooved ends.

## 2.9 DRAIN VALVES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
  - 2. Nibco, Incorporated, Elkhart, IN (800) 642-5463.
  - 3. Stockham Valves and Fittings, Incorporated, Cullman, AL (800) 786-2542.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Bronze compression stop with hose thread, nipple and cap. Use hose thread, nipple and cap only where piping to outside or other approved drainage facility is not readily available.
- C. Brass ball valve with cap and chain, 3/4 inch hose thread.
- D. Use hose thread, nipple and cap.

## 2.10 ALARM CHECK VALVES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
  - 2. Viking Corporation, Hastings, MI (800) 968-9501.
  - 3. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

## 2.11 DRY PIPE VALVES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Grinnell Supply Sales, Company, Grinnell Corporation, Exeter, NH (603) 778-9200.
  - 2. The Viking Corporation, Hastings, MI (800) 968-9501.
  - 3. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

## 2.12 MAINTENANCE AIR COMPRESSOR

- A. If applicable, Subject to compliance with requirements, provide maintenance air compressor of one of the following manufacturers:
  - 1. Reliable Fire Equipment Co, Mt. Vernon, NY (914) 668-3470.
  - 2. The Viking Corporation, Hastings, MI (800) 968-9501.
  - 3. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. If applicable, provide electric, air cooled, tank mounted, inlet filter silencer, fly wheel, belt guard, automatic start-stop control, tank, air dryer, motor with a thermal overload protection rated for continuous operation at the rated capacity, motor control with adjustable pressure switch set to start compressor at 75 percent of the normal pressure to prevent short cycling. Provide desiccator (air dryer) between compressor and dry pipe single stage oilless compressor, equip with check valve, centrifugal pressure and moisture unloader, and pressure switch. Exact location to be approved by Public Authorities, and Contracting Officer.

## 2.13 SPRINKLERS

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Gem Sprinkler Company, Division of Grinnell Corporation, Exeter, NH (603) 778-9200.
  - 2. Reliable Automatic Sprinkler Company, Incorporated, Mt. Vernon, NY (914) 668-3470.
  - 3. The Viking Corporation Hastings, MI (800) 968-9501.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Subject to compliance with requirements, provide automatic sprinklers, with 1/2 inch, 17/32 inch orifice; or 0.64 inch (extra-large) orifice, unless noted otherwise. Sidewall sprinklers are not acceptable, unless noted otherwise.
  - 1. Areas With Exposed Structure Above:
    - a. Standard Sprinklers: Upright sprinkler, bronze.
    - b. Extra Large Orifice Sprinklers: bronze.
  - 2. Areas With Finished Ceilings, Not Visible To The Public: Pendent sprinkler, chrome, with two-piece chrome escutcheon plate.
  - 3. Areas With Finished Ceilings 10 Feet Above Finish Floor or Higher, Visible to the Public: Pendent sprinkler, chrome, with two-piece chrome escutcheon plate.
  - 4. Areas With Finished Ceilings Below 10 Feet Above Finish Floor, Visible to the Public: Pendent sprinkler, chrome, with two-piece 1/2 inch recessed chrome escutcheon plate.
  - 5. Areas With Finished Ceilings Below 7 Feet Above Finish Floor, Not visible to the Public: Recessed Pendent sprinkler, chrome, with two-piece 1/2 inch recessed chrome escutcheon plate and one piece formed wire cage.

## 2.14 SLEEVES AND ESCUTCHEONS

- A. Sleeves through structural concrete members and sleeves for walls below grade and floors on grade shall be standard weight galvanized Schedule 40 steel pipe. Sleeves through other than structural components of the building shall be 20 gage galvanized sheet metal with lock seam joints. Sleeve shall extend two inches past finished surface. USG Thermafiber safing insulation shall be installed between sleeve and pipe.
- B. Pipe escutcheon plates to be installed where exposed piping passes through walls, ceilings, and floors of building shall be minimum 20 gage steel, **chrome**.

## 2.15 ACCESSORIES

- A. Hangers and Supports: Provide hangers and supports as required by NFPA 13 and Public Authorities. Provide seismic bracing in accordance with NFPA 13, as required by state and local codes, and Public Authorities.
- B. Flushing Connections: Provide threaded, capped nipple or mechanical groove end cap on ends of cross mains. If nipple provided, diameter shall be same as pipe, but not larger than 2 inches.
- C. Auxiliary Drains:
  - 1. 5 gallons or greater: provide minimum 1 inch globe valve with hose adapter and cap.
  - 2. Less than 5 gallons: provide minimum 1 inch nipple and cap.
  - 3. All auxiliary drain facilities shall be placed to allow easy access.
- D. If piping or components of Inspector's test connection are modified as a result of this Work, then provide as required by Contractor.

- E. If inspector test valve and auxiliary drain valve are piped together then test drain assembly shall be an approved manufactured assembled unit. Subject to compliance with requirements, provide valves of one of the following manufacturers:
  1. "Test Master", by Victaulic, Easton, PA (610) 559-3300.
  2. Central Sprinkler Corp., Lansdale, PA (800) 523-6512.
  3. Globe Fire Sprinkler Corp., Standish, MI (800) 248-0278.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
  
- F. Horn and Strobe: Provide horn and strobe on exterior of building locate as indicated on drawings or locate as required by Public Authorities.
  
- G. Wet Sprinkler System Water Flow Detectors: Equip sprinkler system risers with double pole vane type flow detector, Model No. VSR-F, by Potter Electric Signal of St. Louis, Missouri, (800) 325-3936. Set adjustable delayed signal at 30 seconds. Connect to alarm system.
  1. Substitutions: Under provisions of Section 016000.
  
- H. Dry Sprinkler System Water Flow Detector: Equip Dry System risers with pressure activated flow detector by Potter Electric Signal of St. Louis, Missouri, (800) 325-3936. Connect to alarm system.
  1. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
  
- I. Control Valve Supervisory Switches:
  1. Equip post indicator valves with tamper switches, Model No. PCVS, as manufactured by Potter Electric Signal of St. Louis, Missouri. Connect to alarm system.
  2. Equip outside screw and yoke valves with tamper switches, Model No. OSYSU-A2 as manufactured by Potter Electric Signal of St. Louis, Missouri. Connect to alarm system.
  3. All valves capable of controlling water supply shall have tamper switches. Connect to alarm system.
  4. If control valve is located remote from store building, provide 3/4 inch conduit, with pull string, from remote location to nearest electrical room.
  5. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
  
- J. Fire Department Connections: Fire Department connections in accordance with NFPA 13 and Public Authorities. Equip with threads/connections compatible with hoses utilized by the local fire department.
  1. Drain: 3/4 inch automatic drip, piped to approved drainage location.
  2. Label: "Auto Sprinkler".
  3. Finish: Red enamel.
  4. Thread/Connection: **NST or Storz**, verify with Public Authorities.
  
- K. Wire Cage Sprinkler Guards: Fig. 6160, by Potter-Roemer or acceptable substitute.
  1. Provide sprinkler guards on sprinkler pendants that are located below 8 feet above finished floor, except at semi-recessed sprinklers.
  
- L. Relief Valves: For gridded sprinkler systems, provide a relief valve not less than 1/4 inch size and set to operate at 175 psi or 10 psi in excess of the maximum system pressure, whichever is greater. Location of relief valves to be in accordance with NFPA 13.

## 2.16 FIRE PUMP MANUFACTURERS

- A. Subject to compliance with requirements, provide pumps of one of the following manufacturers:
  1. Aurora Pump, North Aurora, IL (800) 316-7720.
  2. Fairbanks Morse Pumps, Kansas City, KS (913) 371-5000.
  3. ITT A-C Pump, Cincinnati, OH.
  4. Peerless Pump, Indianapolis, IN (317) 925-9661.

5. Patterson Pump, Toccoa, GA (706) 866-2101
6. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

#### 2.17 HORIZONTAL BASE MOUNTED PUMPS

- A. Type: UL listed and **or** FM approved. Conform to UL 448, horizontal shaft, double suction, direct connected, horizontally split case, for 250 psig maximum working pressure, labeled specifically "FOR FIRE SERVICE".
- B. Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, suction and discharge flange machined to ASME B16-1 dimensions, 250 psi pressure rating.
- C. Impeller: Bronze double suction fully enclosed, statically and dynamically balanced and keyed directly to motorshaft.
- D. Bearings: Grease lubricated ball bearings.
- E. Shaft: Alloy steel with replaceable bronze shaft sleeve.
- F. Seals: Packing gland with minimum four rings graphite impregnated packing and Teflon antern rings, 230 degrees F (110 degrees C) maximum continuous operating temperature.
- G. Drive: Flexible coupling with metal coupling guard.
- H. Base plate: Cast iron or fabricated steel with integral drain rim, provide 3/4 inch threaded outlet for drain
- I. Pump manufacturer shall have unit responsibility for proper operation of the complete unit, and provide services of a factory trained technician to supervise installation, and to attend final field acceptance tests.
- J. Each pump shall be hydrostatically and run tested at the factory before shipment.

#### 2.18 FIRE PUMP ACCESSORIES

- A. Eccentric suction reducer and OS&Y valve on suction side of pump.
- B. Concentric increaser and check valve in pump discharge and butterfly valve on system side of check valve.
- C. Suction pressure gage (compound type), with snubber, valve cock and lever handle.
- D. Discharge pressure gage, with snubber, valve cock and lever handle.
- E. Casing 3/4 inch relief valve minimum.
- F. Float operated 1 inch automatic air release valve.
- G. Hose valve manifold with 2 1/2 inch hose gate valves with caps and chains. Size per NFPA 20.
- H. Fire pump bypass on electric pump fitted with butterfly valves and check valve.

## 2.19 ELECTRIC MOTOR DRIVER

- A. Motor: Squirrel cage induction type; in open drip proof NEMA MG-1 enclosure.
- B. Power: 480 volt, three phase, 60 Hz.

## 2.20 FIRE PUMP CONTROLLER

- A. Subject to compliance with requirements, provide fire pump controller of one of the following manufacturers:
  - 1. Firetrol, Inc., Cary, NC (919) 460-5200.
  - 2. Master Control, Lake Bluff, IL (847) 295-1010.
  - 3. Metron, Inc., Denver, CO (303) 592-1903.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Controller: UL listed and **or** FM approved for fire pump service with across-the-line starter, in NEMA 4 enclosure, including the following:
  - 1. Disconnect Switch: Externally operable, quick break type.
  - 2. Circuit Breaker: Trips in each phase calibrated at least to 300 percent of the motor full-load current, interrupting capacity shall be equal to or exceed maximum fault current at site, but shall in no case be less than **150,000** amps RMS symmetrical at 480 VAC.
  - 3. Motor Starter: Energized automatically through pressure switch or manually by externally operable handle.
  - 4. Pressure Switch: Bourdon Tube Type with adjustable independent high and low set points and a range of 10 psi to 300 psi.
  - 5. Running Period Timer: Keeps motor in operation when started automatically, for a minimum of 10 minutes.
  - 6. Ammeter test link and voltmeter test studs.
  - 7. Remote start switch relay.
  - 8. Manual Selector Station: On enclosure marked "Automatic" and "Non-Automatic."
  - 9. Normally open dry contacts for remote indication of all tamper switches (common), circuit breaker open, low pump house temperature (below 45° F), power available, low pressure, local start, remote start, phase failure, phase reversal, pump running, run timer on, and all signals required by NFPA 20.
  - 10. Weekly Test Start: Provide ability to set day of week, time of day and running timer for the test period (0 to 30 minutes).
  - 11. Supervised control circuit which automatically starts pump upon failure of control power transformer or control relays.
  - 12. Externally mounted visible indicators for power available, low pump house temperature, low pressure, local start, remote start, phase failure, phase reversal, pump running and run timer on.
  - 13. Automatic shut-off timer set for 10 minutes, to operate only after starting causes return to normal.
  - 14. Front mounted, front wired, and front accessible controller components, including circuit breaker and contactors.
  - 15. Grounding lug and bonding provisions.

## 2.21 PRESSURE BOOSTER (JOCKEY) PUMPS

- A. Subject to compliance with requirements, provide pressure booster (jockey) pump of one of the following manufacturers:
  - 1. Aurora Pump, North Aurora, IL (800) 316-7720.
  - 2. Grundfos Pump, Clovis, CA (209) 292-8000.
  - 3. Peerless Pump, Indianapolis, IN (317) 925-9661.
  - 4. Patterson Pump, Toccoa, GA (706) 866-2101

- 5. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Power: 480 volt, three phase, 60 Hz.
- C. Type: Electrically operated, vertical multi-stage type with standard open drip-proof motor, factory assembled and factory tested.
- D. Casing: Cast iron, with suction and discharge connections of size indicated. threaded, or flanged and machined to ASME B16.1 dimensions, and 250 psig minimum pressure rating.
- E. Impeller: Bronze or stainless steel.
- F. Shaft: Stainless steel.
- G. Seals: Mechanical.
- H. Controller: Enclosed in floor mounted NEMA 4 steel housing, UL listed and labeled. Factory assembled, wired, and tested, with full voltage starter. Provide separate controller for jockey pump, with magnetic contactor, fusible disconnect switch, pressure switch and minimum run period timer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Examine areas in which Work of this Section is to be performed.
  - 2. Verify that surfaces and site conditions are ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

#### 3.2 PREPARATION

- A. Coordinate work of this Section with other affected work and construction schedule.
- B. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- C. Remove scale and foreign material, from inside and outside, before assembly.
- D. Prepare piping connections to equipment with flanges or unions.
- E. Install system and equipment in accordance with manufacturer's instructions, and NFPA Standards.

#### 3.3 INSTALLATION - BELOW GROUND PIPING



- A. Install piping and system components in accordance with NFPA 24. Verify that main feed from water supply source to building is as specified.
- B. Support barrel of pipe for entire length on compacted pipe bedding. Excavate for couplings, fittings and valves.
- C. Lay pipe to lines and grades as required.
- D. Keep interior of pipe free from dirt and other foreign material as installation progresses. Plug open ends when work is stopped. Join lengths with couplings in accordance with pipe manufacturer's instructions. Join to fittings and valves that have rubber ring bells with same groove dimensions and tolerance as pipe.
- E. Provide valves and fittings as necessary.
- F. Install concrete thrust blocks as required. Place concrete between undisturbed soil with fittings anchored. Do not cover coupling flanges or other joints with concrete.

### 3.4 INSTALLATION - ABOVE GROUND PIPING

- A. Install piping in accordance with NFPA 13. Install sprinkler piping products in accordance with recognized industry practices to ensure that fire protection sprinkler piping complies with requirements and serves intended purposes.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient. Use eccentric reducers to maintain top of pipe level. Slope piping and arrange systems to drain. Size drain piping as required to drain sprinkler system properly. Provide drain valves at main shut-off valves and low points of piping.
  - 1. Pitch piping as required in dry pipe systems. If applicable:
    - a. Dry pipe Branch lines: Slope 1/2 inch for every 10 feet.
    - b. Dry pipe Mains: Slope 1/4 inch for every 10 feet.
- C. Install piping to conserve building space. Do not interfere with use of building space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. All system components shall be concealed above ceilings where ceilings exist.
- G. Replace sprinklers having paint other than factory finish with new sprinklers. Cleaning and reuse of painted sprinklers is prohibited.
- H. Do not penetrate building structural members. Examine other work indicated on the Contract Documents and conditions at job site. Coordinate routing of work with other construction trades to avoid interference with other installations. Do not cut building structural members, beams, joists, etc. for routing of sprinkler piping. In the event of conflicts, consult Contracting Officer, and their decision shall govern.
- I. Provide sleeves when penetrating floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required. Provide wall plates at all penetrations.
- J. Die cut screw joints with full cut standard taper pipe threads with non-toxic joint compound applied to male threads only. Recoat threads on galvanized pipe with galvanized coating.

- K. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.
- L. Route piping and locate sprinklers as required to avoid building structure equipment, plumbing piping, heating and air conditioning piping, ductwork, lighting fixtures, electrical conduits and bus ducts, and similar work.
  - 1. Final location of lighting will have priority over final sprinkler locations.
- M. Provide pipe offsets as required to complete installation. Modify shop prefabricated piping, pipe hangers, and other components as required to fit the job site conditions.
- N. Shop drill and weld weld-o-lets on piping.
- O. Conceal piping in chases, walls, furred spaces and above ceiling in areas with dropped ceilings.
- P. If piping or components of Inspector's Test Connection are modified as a result of this Work, then:
  - 1. Provide one inspector's test valve for each system at the most remote point of the system along the exterior wall, piped to non-public areas.
  - 2. Install inspector's test valves at five feet (minimum) to seven feet (maximum) above finish floor to facilitate bi-monthly tests.
  - 3. Coordinate test valve locations with Contracting Officer.
  - 4. Test connection shall discharge at location approved by Contracting Officer.
  - 5. Outlet shall have same orifice as sprinklers.
- Q. Piping shall maintain clearance from electrical equipment as required by NEC and Public Authorities. Drains and Inspector's test connection shall not be piped into or through electrical rooms/areas.
- R. Sprinkler piping that passes through unheated spaces in or under structures and are exposed to freezing shall be protected from freezing as indicated or in accordance with applicable methods in NFPA 13.
- S. Provide valves as required to comply with NFPA Standards and requirements of Public Authorities. Provide backflow prevention devices, check valves, and drains where required by Public Authorities.
- T. Make reductions in pipe sizes with one-piece reducing fittings. Bushings are not acceptable. Use flanged fittings at base of risers.
- U. Contractor shall notify Contracting Officer one week prior to any sprinkler system shutdown or work performed.
- V. All system components (i.e. pipe, fittings, supports, and accessories), except sprinklers, not concealed shall be prepared for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. Apply masking tape or paper cover to ensure sprinkler do not receive field paint finish. Remove tape or paper after painting.
- W. Locate sprinklers in suspended ceiling tiles along the centerline of the two foot dimension, and at one foot increments from the edge in the four foot dimension direction. Provide piping offsets as necessary to locate sprinklers.
- X. Dry Pendent Sprinklers: Install concealed above ceilings where ceilings are used.
- Y. Anti-freeze Systems (where required): Install "Loop", concealed, above ceilings where ceilings are used, or as required by Public Authorities, and Contracting Officer.
- Z. If applicable, install maintenance air compressor adjacent to dry pipe riser. Connect 1/4 inch compressor outlet with the 1/4 inch pipe through a shutoff valve to the system side of dry pipe valve. Adjust pressure switch to the required setting.

- AA. Locate wet pipe (and dry pipe if required) inspector test valves and associated sight glasses at remote ends of system, in accessible locations. Provide drain pipes as required by Contracting Officer.

### 3.5 FIRE PUMP

- A. Provide direct feed power supply to fire pump controller from power source with no fuses or breakers in the circuit. See Section 013300 for electrical diagram submittal requirements.
- B. Provide access space around pumps for service. Provide no less than minimum as recommended by manufacturer.
- C. Support piping adjacent to pump such that no weight is carried on pump casings. For base mounted pumps, provide supports under elbows on pump suction and discharge.
- D. Provide drains for bases and seals, piped to and discharging into floor drains.
- E. Mount unit on vibration isolators.
- F. Provide for connection to electrical service.
- G. Lubricate pumps before start-up.
- H. Check, align, and certify base mounted pumps by qualified millwright prior to start-up.
- I. Electric Fire Pump System:
  - 1. Suction pipe, valve, and fittings.
  - 2. Discharge pipe, valve and fittings.
  - 3. Bypass pipe, valves and fitting.
  - 4. Jockey pump suction and discharge pipe, valves and fittings.
  - 5. Controllers mounted, pipe and wired.
  - 6. Gland drip pockets piped to common drain for skid.
  - 7. Gauges and air release valve installed.
  - 8. Structural steel skid with checkered steel floor plate.
  - 9. Piping, equipment and structural skid painted red.
  - 10. Provide testing and operation instructions on laminated/weather protected wall mounted sign. Submit example to of Record for approval prior to installation.
- J. Locate Fire Department connection on discharge side of pump.
- K. Locate controller as close to motor as practical and within sight. Provide controller with suitable protection as necessary to protect against water escaping from pump or connections. Elevate controller minimum of 12 inches above finished floor.

### 3.6 PROTECTION OF WORK

- A. Protect work from danger of freezing, breakage, dirt, foreign materials, etc., and replace work so damaged. Use every precaution to protect work of others.

### 3.7 IDENTIFICATION

- A. Apply signs to control, drain, test and alarm valves, etc., to identify their purposes and functions. Provide lettering sizes and styles selected by Contracting Officer from NFPA's suggested styles.
- B. Stencil riser/zone numbers on risers.

- C. Provide hydraulic placard for each sprinkler system in accordance with NFPA 13.

### 3.8 CLEANING AND FLUSHING

- A. Prior to connecting overhead system piping to underground supply system piping, flush underground supply system piping per NFPA 13 and 24.

### 3.9 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Procedures for field inspection and testing of installation.

- B. Site Tests - Leaks from System:

- 1. Contractor shall identify to Contracting Officer any leaks or damage that occur within the system as a result of testing. Contractor shall take necessary precautions to limit any potential damage. Corrective action shall be performed at Contractors expense.

- C. Site Tests - Above Ground Fire Protection Piping:

- 1. Test system pressure piping for leakage as required by and in presence of Public Authorities, and Contracting Officer Test to consist of holding the test pressure at the high end for a period of two hours. Test pressure: 200 psi or 50 psi over normal operating pressure, whichever is greater. Conduct test in accordance with NFPA 13. Send completed copy of the material and test certificate to Contracting Officer.
- 2. All required tests shall be witnessed by Public Authorities, and Contracting Officer.
- 3. Inspection of welds, and/or verification of welder's qualifications may be required by Public Authorities. Contractor shall comply with all requirements of Public Authorities, including but not limited to :
  - a. Provide written documentation of welders qualifications and certification.
  - b. Stamp imprint of welders identification adjacent to all welds.
  - c. Provide provisions for, schedule and conduct inspection of all welds . Inspection shall be scheduled at project site, with pipe at grade level, prior to installation.

- D. Site Tests - Under Ground Fire Protection Piping:

- 1. Test pressure piping for leakage in presence of Public Authorities and Contracting Officer. Test to consist of holding the test pressure in each section of line tested for a period of two hours. Test pressure at the high end of each test section shall be 200 psi or 50 psi over normal operating pressure whichever is greater. Conduct test in accordance with NFPA 24.
- 2. Flush underground mains and lead-in connections thoroughly before connection is made to above ground system piping to remove foreign material. Minimum flow rate shall not be less than the maximum water flow demand rate of the system and not less than necessary to provide a velocity of 10 feet per second. Continue flushing for sufficient time to ensure thorough cleaning. Provide proper disposal of water from flushing operation.
- 3. All required tests shall be witnessed by Public Authorities, and Contracting Officer.
- 4. Contractor shall identify to Contracting Officer any leaks or damage that occur within the system as a result of testing. Contractor shall take necessary precautions to limit any potential damage. Corrective action shall be performed at Contractors expense

- E. Site Tests - Fire Pump:

- 1. Test pump in accordance with NFPA 20. Send completed copy of the material and test certificate to Public Authorities, and Contracting Officer.
- 2. Contractor shall be responsible for providing all personnel and equipment necessary for complete start up and acceptance testing purposes. Minimum equipment required:
  - a. Three (3) 50 feet sections of 2 1/2 inch 300 pound test rubber lined with 100 percent polyester jacket, equivalent to Potter Roemer Fig. 2902. Provide with Double Lug Couplings, equivalent to Potter Roemer Fig. 2936.

- b. Three (3) Underwriters Play Pipes with swivel handle and marlin wound brass pipe. Provide each with 1 3/4 inch tip orifice, equivalent to Potter Roemer Fig. 2949
  - c. One (1) Pitot tube equipped with calibrated bourdon tube gauge, with storage case. Provide each with flow rate computation table, equivalent to Potter Roemer.
  - 3. Notify Public Authorities, and Contracting Officer two weeks prior to any fire pump acceptance test so a representative may witness testing.
  - 4. Factory Test: All equipment will be factory tested in accordance with the requirements of NFPA, U.L. and FM.
  - 5. Start-Up Service: The service of a factory trained representative for the controllers, and pumps shall be available on the job site to check installation, conduct field acceptance testing, conduct start-up, and instruct personnel.
- F. All required tests shall be witnessed by Public Authorities, and Contracting Officer.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

SECTION 220000

PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

- A. Sanitary drainage and vent piping.
- B. Storm drainage piping.
- C. Domestic water service and distribution.
- D. Plumbing fixtures and trim, fittings and accessories, appurtenances, fasteners, and associated supports.
- E. Plumbing specialties associated with sanitary, storm, domestic water, air, and natural gas systems.

1.2 SUBMITTALS

- A. Product Data: Required.
- B. Shop Drawings: Required.

1.3 QUALITY ASSURANCE

- A. Approval stamp label or other marking on piping made to standards.
- B. Comply with ASME B31.9, "Building Services Piping", for materials, products, and installation.
- C. Comply with NSF 61, "Drinking Water System Components – Health Effects", for potable water piping and components.

PART 2 - PRODUCTS

2.1 PIPING

- A. Piping systems shall be constructed of the following materials as scheduled below, subject to approval by authorities having jurisdiction.

SYSTEMS	PIPE	FITTINGS	REMARKS
Soil, waste, vent & storm drainage piping, underground in building to 5 feet outside of building	ASTM D2665 solid wall PVC socket type, SDR-35	ASTM D3311 PVC, SDR-35 socket type fittings and solvent-cemented joints.	PVC allowed only where allowed by local codes.

Soil, waste, vent & storm drainage piping, above ground	Service weight cast iron, no-hub	Cast iron recessed drainage fittings with elastomeric gasket and stainless-steel clamps	
	Polyvinylchloride (PVC) bell and spigot, SDR-35	ASTM D3311 PVC, SDR-35 socket type fittings and solvent-cemented joints.	PVC allowed only where allowed by local codes.
Interior building or above ground domestic water systems, 4 inches and smaller (cold, hot & hot water systems)	Type L hard drawn copper tubing with 95-5 tin antimony solder joints	Soldered or cast bronze flanged fittings	Class 150, ANSI B16.24 flange
Relief valve discharge piping for water systems	Type L hard drawn copper tubing with 95-5 tin antimony solder joints	Cast bronze or wrought copper with solder joints, or compression fittings	Provide dielectric unions for ferrous to non-ferrous pipe connections

## 2.2 VALVES

### A. Domestic Water System Isolation Valves:

1. 2 inches and smaller shall be 150 lb. WOG, two-piece ball valves with bronze body, brass ball and trim with Teflon seats and seals, solder ends.
2. 2-1/2 inches shall be class 125 bronze gate valves with rising stem, solder ends.
3. 3 inches and larger shall be class 125 iron body bronze mounted O. S & Y rising stem with flanged ends.

## 2.3 SPECIALTIES

### A. Water Hammer Arrestor: PDI WH-201, precharged.

### B. Backflow Preventers:

1. Reduced Pressure Backflow Preventers: ASSE 1013; bronze body; assembled with two gate valves, strainer, and four test cocks.

## 2.4 PLUMBING FIXTURES

### A. General

1. Water closets, urinals, flush valves, and faucets must bear WaterSense label.
2. Water closets, urinals, flush valves, and faucets manufacturers must be a WaterSense partner with US EPA.

### B. Flush Valve Water Closet:

1. Bowl: Wallmounted vitreous China closet, siphon jet, 1.28 GPF, with elongated rim.
2. Flush Valve: Exposed chrome plated, diaphragm type, manually operated, integral screwdriver stop, vacuum breaker.
3. Seat: Solid molded white plastic, open front, self-sustaining stainless-steel hinge.
4. Foot supported carrier for wall mounting water closet.
5. ADA/U.S.P.S. Handbook RE-4 compliant where indicated.

### C. Tank Type Water Closet:

1. Bowl: Wall mounted vitreous China closet, siphon jet, 1.28 GPF, with elongated rim.
2. Seat: Solid molded white plastic, open front, self-sustaining stainless-steel hinge.
3. Foot supported carrier for wall mounting water closet.

4. ADA/U.S.P.S. Handbook RE-4 compliant where indicated.
- D. Tank Type Water Closet:
1. Bowl: Floor mounted vitreous China closet, siphon jet, 1.28 GPF, with elongated rim.
  2. Seat: Solid molded white plastic, open front, self-sustaining stainless-steel hinge.
  3. Foot supported carrier for wall mounting water closet.
  4. ADA/U.S.P.S. Handbook RE-4 compliant where indicated.
- E. Urinal:
1. Urinal: Vitreous China with shields, siphon jet, 0.5 GPF, integral trap, stainless steel strainer, steel supporting hanger.
  2. Flush Valve: Exposed chrome plated, diaphragm type, manually operated, integral screwdriver stop, vacuum breaker.
  3. Wall hung.
  4. ADA/U.S.P.S. Handbook RE-4 compliant where indicated.
- F. Lavatory:
1. Basin: Vitreous China 20 x 18 minimum, with concealed arm carrier.
  2. Trim: Chrome plated supply fitting with open grid strainer, water economy vandal-resistant aerator, all brass body.
  3. Faucet: Single lever faucet with aerator with 0.5 GPM flow restrictor.
  4. Wall mounted.
  5. ADA/U.S.P.S. Handbook RE-4 compliant, where indicated, with trap and wall supply guard.
- G. Counter Sink:
1. Bowl: Single compartment 25 x 22 x 8 inch outside dimensions, Type 302 stainless steel, 3-½ inch crumb cup and chromed brass drain, drilled ledge back.
  2. Trim: Chrome plated supply fitting with 8-inch spout, water economy vandal-resistant aerator, lever handles.
- H. Electric Water Cooler:
1. Cooler: Bi-level handicap wall mounted ADA/U.S.P.S. Handbook RE-4 compliant cooler, lead-free, with stainless steel top, vinyl on steel body, bubbler, stream regulator, mounting bracket.
  2. Capacity: 8.0 gph of 50-degree F water with inlet at 80-degree F and room temperature of 90-degree F.
  3. Refrigerant shall be R-134a.
- I. Disposer:
1. Shock absorbing mounting, all stainless-steel cutting action, replaceable hammers and rind kicker, two-position stopper, lifetime lubrication, overload protection, 115 VAC, 5 year warranty.
- J. Thermostatic Mixing Valves:
1. Cabinet mounted with check stops; adjustable thermostat factory set for 98F.

## PART 3 - EXECUTION

### 3.1 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 fixtures level and plumb according to roughing-in drawings.
- G. 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.
- H. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- J. 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.
- K. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- L. Install toilet seats on water closets.
- M. 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.
- N. Install traps on fixture outlets.
  - 1. Exception: Omit trap on fixtures with integral traps.
  - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- O. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- P. Install escutcheons at piping wall and 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 23 Section "Common Work for Plumbing."
- Q. 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 7 Section "Joint Sealants."
- R. Provide dielectric connections wherever joining dissimilar metals.
- S. Install water hammer arrestors complete with accessible isolation valve.
- T. Install each plumbing fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons.

### 3.2 CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Ground equipment according to Division 26 Section "Grounding and Bonding."
- C. Connect wiring according to Division 26 Section "Conductors and Cables."

### 3.3 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.

### 3.4 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities.

END OF SECTION

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## SECTION 220500

### COMMON WORK RESULTS FOR PLUMBING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Piping materials and installation instructions common to most piping systems.
  - 2. Dielectric fittings.
  - 3. Mechanical sleeve seals.
  - 4. Sleeves.
  - 5. Escutcheons.
  - 6. Grout.
  - 7. Plumbing identification.

##### 1.2 DEFINITIONS

- A. Finished Spaces: Spaces other than plumbing 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 plumbing 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.

##### 1.3 SUBMITTALS

- A. Welding certificates.

##### 1.4 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.

## PART 2 - PRODUCTS

### 2.1 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.

### 2.2 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B32, lead-free alloys. Include water-flushable flux according to ASTM B813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12.
- G. Solvent Cements for Joining Plastic Piping:
  1. PVC Piping: ASTM D2564. Include primer according to ASTM F656.

### 2.3 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.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
- E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- F. 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.

## 2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Plastic, Carbon steel or Stainless steel Include two for each sealing element.
- D. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating or Stainless steel 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 A53, 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 D1785, Schedule 40.

## 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: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
  - 1. Finish: Polished chrome-plated.

## 2.7 GROUT

- A. Description: ASTM C1107, Grade B, non-shrink, and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.
  - 3. Packaging: Premixed and factory packaged.

## 2.8 PLUMBING IDENTIFICATION

- A. Equipment Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color.
- B. Tags
  1. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches diameter.
  2. Metal Tags: Brass, Aluminum, or Stainless Steel with stamped letters; tag size minimum 1-1/2 inches diameter or square with smooth edges.
  3. Information Tags: Clear plastic with printed "Danger," "Caution," or "Warning" and message; size 3-1/4 x 5-5/8 inches with grommet and self-locking nylon ties.
  4. Tag Chart: Typewritten letter size list in anodized aluminum frame and plastic laminated.
- C. Pipe Markers
  1. Color and Lettering: Conform to ASME A13.1.
  2. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.
  3. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings with flow direction.
  4. Plastic Underground Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

## PART 3 - EXECUTION

### 3.1 PLUMBING DEMOLITION

- A. Refer to Division 1 Section "Cutting and Patching" and Division 2 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 Owner.
- 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.
- 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.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- 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 7 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 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 B813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B32.
- 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. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F402, for safe-handling practice of cleaners, primers, and solvent cements.
  - 2. PVC Pressure Piping: Join schedule number ASTM D1785, PVC pipe and PVC socket fittings according to ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D2855.
  - 3. PVC Nonpressure Piping: Join according to ASTM D2855.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D3212.

### 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 INSTALLATION - PLUMBING IDENTIFICATION

- A. Install identifying devices after completion of coverings and painting.
- B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.
- C. Install tags using corrosion resistant chain. Number tags consecutively by location.
- D. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- E. Identify plumbing equipment with plastic nameplates. Locate equipment labels where accessible and visible.
- F. Identify control panels and major control components outside panels with plastic nameplates.
- G. Identify valves in main and branch piping with tags.
- H. Identify piping, concealed or exposed, with plastic pipe markers and plastic tape pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.
- I. 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.
  - 8. Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

### 3.7 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

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## SECTION 220719

### PLUMBING PIPING INSULATION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Piping insulation.
  - 2. Insulation jackets.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

##### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
  - 2. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
  - 3. ASTM C335 - Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
  - 4. ASTM C518 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 5. ASTM C534 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
  - 6. ASTM C547 - Mineral Fiber Pipe Insulation.
  - 7. ASTM C553 - Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
  - 8. ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.
  - 9. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
  - 10. ASTM E84 - Surface Burning Characteristics of Building Materials.
  - 11. ASTM E96 - Water Vapor Transmission of Materials.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
  - 1. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- D. Underwriters Laboratories, Inc. (UL):
  - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

## 1.4 QUALITY ASSURANCE

### A. Qualifications:

1. Manufacturer: Company specializing in manufacturing Products specified with minimum 3 years documented experience.
2. Installer: Company specializing in performing the Work of this Section with minimum 3 years documented experience.

### B. Materials:

1. Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255 and UL 723.
2. Insulation for duct, pipe and equipment for above grade exposed to weather outside building shall be certified as being self-extinguishing for 1 inch thickness less than 53 seconds when tested in accordance with ASTM D1692.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Deliver materials to site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- C. Store insulation in original wrapping and protect from weather and construction traffic.
- D. Protect insulation against dirt, water, chemical, and mechanical damage.

## 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

### A. Jobsite Requirements

1. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
2. Maintain temperature during and after installation for minimum period of 24 hours.

## 1.7 ENVIRONMENTAL REQUIREMENTS

### A. Energy efficiency:

1. Insulation: Minimum thickness in accordance with ASHRAE 90.1. Provide additional thickness to ensure surface temperatures are below 100 degrees and to prevent condensation on cold surfaces.

## PART 2 - PRODUCTS

### 2.1 PIPING INSULATION

#### A. Glass Fiber

1. Manufacturers:
  - a. CertainTeed Insulation, Valley Forge, PA (800) 233-8990.
  - b. Other acceptable manufacturers offering equivalent products.
    - 1) Knauf Fiber Glass.
    - 2) Manville Insulation, Inc.
    - 3) Owens-Corning Fiberglass
2. Insulation: ASTM C547; rigid molded, noncombustible.

- a. 'K' ('ksi') value : ASTM C335, 0.24 at 75 degrees F.
  - b. Minimum Service Temperature: -20 degrees F.
  - c. Maximum Service Temperature: 300 degrees F.
  - d. Maximum Moisture Absorption: 0.2 percent by volume.
3. Vapor Barrier Jacket
- a. ASTM C921, White kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
  - b. Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
  - c. Secure with self sealing longitudinal laps and butt strips.
  - d. Secure with vapor barrier mastic.
4. Tie Wire: 18 gage stainless steel with twisted ends on maximum 12 inch centers.
5. For insulation outdoors, provide stainless steel jacket, bonded, overlapped, screwed with pop rivets or screws, and sealant placed on joints as per manufacturers recommendation for a water-tight joint.
- B. Cellular Foam
1. Manufacturers:
- a. Armstrong World Industries, Inc, Lancaster, PA (800) 448-1405.
  - b. Other acceptable manufacturers offering equivalent products.
    - 1) Halstead Industries, Inc.
    - 2) Rubatex Corporation, Armaflex II.
2. Insulation: ASTM C534; flexible, cellular elastomeric, molded or sheet.
- a. 'K' ('ksi') Value: ASTM C177 or C518; 0.27 at 75 degrees F,
  - b. Minimum Service Temperature: -40 degrees F.
  - c. Maximum Service Temperature: 220 degrees F.
  - d. Maximum Moisture Absorption: ASTM D1056; 1.0 percent (pipe) by volume, 1.0 percent (sheet) by volume.
  - e. Moisture Vapor Transmission: ASTM E96; 0.20 perm inches.
  - f. Maximum Flame Spread: ASTM E84; 25.
  - g. Maximum Smoke Developed: ASTM E84; 50.
  - h. Connection: Waterproof vapor barrier adhesive.
3. Elastomeric Foam Adhesive
- a. Manufacturers:
    - 1) Dow U.S.A.
    - 2) H. B. Fuller Co.
    - 3) Rubatex Corporation.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
  - 1. Verify that piping has been tested before applying insulation materials.
  - 2. Verify that ductwork has been tested before applying insulation materials.
  - 3. Verify that surfaces are clean, foreign material removed, and dry.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION - PIPING INSULATION

- A. Install materials in accordance with manufacturer's instructions and ASHRAE 90.1.
- B. On exposed piping, locate insulation and cover seams in least visible locations.
- C. Insulated dual temperature pipes or cold pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory applied, or field applied.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe.
  - 3. PVC fitting covers may be used.
  - 4. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
  - 5. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- D. For insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory applied, or field applied.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
  - 3. Finish with glass cloth and adhesive.
  - 4. PVC fitting covers may be used.
  - 5. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
  - 6. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- E. Inserts and Shields:
  - 1. Application: Piping 3 inches diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert Location: Between support shield and piping and under the finish jacket.
  - 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  - 5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- F. Finish insulation at supports, protrusions, and interruptions.
- G. For all insulated piping located 8 feet and below, provide a PVC jacket. For all exposed insulated piping above 8 feet finish with manufacturer's standard all-service jacket for fiberglass or cellular glass insulated pipe. No jacket required for elastomeric foam insulation.
- H. For exterior applications, provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with banded aluminum jacket with seams located on bottom side of horizontal piping.
- I. For buried piping, use elastomeric foam insulation only.
- J. For heat traced piping, insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

### 3.3 CONSTRUCTION

- A. Substituted insulation materials shall provide thermal resistance within 10 percent at normal conditions, as materials indicated.

3.4 PIPING INSULATION SCHEDULE

A. Glass Fiber Insulation Schedule:

PIPING SYSTEMS	PIPE SIZE (INCHES)	THICKNESS (INCHES)
Plumbing Systems:		
Domestic Hot Water Supply .....	All.....	1
Domestic Hot Water Recirc.....	All.....	1
Tempered Domestic Water Supply .....	All.....	1/2
Tempered Domestic Water Recirc .....	All.....	1/2
Domestic Cold Water .....	All.....	1/2

B. Cellular Foam Insulation Schedule

PIPING SYSTEMS	PIPE SIZE (INCHES)	THICKNESS (INCHES)
Plumbing Systems:		
Domestic hot water supply .....	All.....	1/2
Domestic hot water recirc.....	All.....	1/2
Tempered Domestic Water Supply .....	All.....	3/8
Tempered Domestic Water Recirc .....	All.....	3/8
Domestic Cold Water .....	All.....	3/8

END OF SECTION

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## SECTION 221116

### DOMESTIC WATER PIPING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
  - 2. Specialty valves.
  - 3. Flexible connectors.
  - 4. Escutcheons.
  - 5. Sleeves and sleeve seals.

##### 1.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Domestic water piping and support and installation shall withstand effects of earthquake motions determined according to ASCE/SEI 7, where required by local codes/ordinance.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.

##### 1.4 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.

#### 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 B88, Type L water tube, drawn temper.
  - 1. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
  - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.



- 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint ends.
- B. Soft Copper Tube: ASTM B88, Type K water tube, annealed temper.
  - 1. Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

## 2.3 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, unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Solder Filler Metals: ASTM B 2, lead-free alloys. Include water-flushable flux according to ASTM B813.
- C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

## 2.4 SPECIALTY VALVES

- A. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

## 2.5 TRANSITION FITTINGS

- A. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- B. Sleeve-Type Transition Coupling: AWWA C219.

## 2.6 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. Description:
    - a. Pressure Rating: 150 psig at 180 deg F.
    - b. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
  - 1. 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. 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 Nipples:
  - 1. Description:
    - a. Electroplated steel nipple complying with ASTM F1545.

- b. Pressure Rating: 300 psig at 225 deg F.
- c. End Connections: Male threaded or grooved.
- d. Lining: Inert and noncorrosive, propylene.

## 2.7 FLEXIBLE CONNECTORS

- A. 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.
  - 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
  - 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

## 2.8 ESCUTCHEONS

- A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.
- B. One Piece, Cast Brass: Polished, chrome-plated finish with setscrews.
- C. Split Casting, Cast Brass: Polished, chrome-plated finish with concealed hinge and setscrew.
- D. G.One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- E. Split-Casting Floor Plates: Cast brass with concealed hinge.

## 2.9 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. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Galvanized-Steel-Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.
- E. 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.

## 2.10 SLEEVE SEALS

- A. 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: Stainless steel.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

## 2.11 GROUT

- A. Standard: ASTM C1107, 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 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 shutoff valve immediately upstream of each dielectric fitting.
- D. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.
- E. Install domestic water piping level and plumb.
- F. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- G. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- H. 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.
- I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- J. Install piping adjacent to equipment and specialties to allow service and maintenance.
- K. Install piping to permit valve servicing.
- L. 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.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- P. Install pressure gages on suction and discharge piping from each plumbing pump and packaged booster pump.
- Q. Install thermostats in hot-water circulation piping.

### 3.2 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. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- D. Soldered Joints: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B828 or CDA's "Copper Tube Handbook."
- E. 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.
- F. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

### 3.3 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division Division 23 Section "General Duty Valves for HVAC 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 valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.
- C. 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.

### 3.4 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:

### 3.5 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 dielectric unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 64: Use dielectric flanges or flange kits.

### 3.6 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 stainless-steel-hose flexible connectors in steel domestic water piping.

### 3.7 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements 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.
  - 3. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. 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.
- E. Install supports for vertical copper tubing every 10 feet.

### 3.8 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.

### 3.9 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, stamped steel with set screw or spring clips
  - 3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece or split plate, stamped steel with set screw or split plate, stamped steel with set screw.
  - 4. Bare Piping in Unfinished Service Spaces: One piece, stamped steel with set screw or spring clips.
  - 5. Bare Piping in Equipment Rooms: One piece, stamped steel with set screw or spring clips.

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 hinge and spring clips.
  3. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split casting, cast brass with chrome-plated finish.
  4. Bare Piping at Ceiling Penetrations in Finished Spaces: Split casting, cast brass with chrome-plated finish.
  5. Bare Piping in Unfinished Service Spaces: Split casting, cast brass with polished chrome-plated finish.
  6. Bare Piping in Equipment Rooms: Split casting, cast brass.
  7. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting floor plate.

### 3.10 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 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: 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. 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 1/2-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.
- 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 7 Section "Penetration Firestopping" for firestop materials and installations.

### 3.11 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.

### 3.12 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Common Work Results for Plumbing" for identification materials and installation.
- B. Label pressure piping with system operating pressure.

### 3.13 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.

### 3.14 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. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

### 3.15 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. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:
  1. Hard copper tube, ASTM B88, Type L; wrought-copper solder-joint fittings; and soldered joints.
- D. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be the following:
  1. Hard copper tube, ASTM B88, Type L; wrought-copper solder-joint fittings; and soldered joints.

### 3.16 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 ball valves with flanged ends for piping NPS 2-1/2 and larger
  2. 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

USPS MPF Specification Last Revised: 10/1/2022

## SECTION 221119

### DOMESTIC WATER PIPING SPECIALTIES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following domestic water piping specialties:
  - 1. Vacuum breakers.
  - 2. Backflow preventers.
  - 3. Water pressure-reducing valves.
  - 4. Balancing valves.
  - 5. Temperature-actuated water mixing valves.
  - 6. Water hammer arresters.
- B. See Division 22 Section "Domestic Water Piping" for water meters.
- C. See Division 22 Section "Drinking Fountains and Water Coolers" for water filters for water coolers.

##### 1.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

##### 1.4 QUALITY ASSURANCE

- A. 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. 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: Chrome plated.

## 2.2 BACKFLOW PREVENTERS

### A. Intermediate Atmospheric-Vent Backflow Preventers:

- 1. 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: As indicated on drawings.
- 5. Body: Bronze.
- 6. End Connections: Union, solder joint.
- 7. Finish: Rough bronze.

### B. Reduced-Pressure-Principle Backflow Preventers:

- 1. 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. Watts Industries, Inc.; Water Products Div.
  - f. Zurn Plumbing Products Group; Wilkins Div.
- 2. Standard: ASSE 1013.
- 3. Operation: Continuous-pressure applications.
- 4. Pressure Loss: 7 psig maximum, through middle 1/3 of flow range.
- 5. Size: As indicated on drawings.
- 6. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
- 7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
- 8. Accessories:
  - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
  - b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

### C. Double-Check Backflow-Prevention 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. Ames Co.
  - b. Conbraco Industries, Inc.

- c. FEBCO; SPX Valves & Controls.
  - d. Flomatic Corporation.
  - e. Watts Industries, Inc.; Water Products Div.
  - f. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1015.
  3. Operation: Continuous-pressure applications, unless otherwise indicated.
  4. Pressure Loss: 4 psig maximum, through middle 1/3 of flow range.
  5. Size: As indicated on drawings.
  6. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
  7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
  8. Accessories:
    - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.

### 2.3 WATER PRESSURE-REDUCING VALVES

#### A. Water Regulators:

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. Honeywell Water Controls.
  - d. Watts Industries, Inc.; Water Products Div.
  - e. Zurn Plumbing Products Group; Wilkins Div.
2. Standard: ASSE 1003.
3. Pressure Rating: Initial working pressure of 150 psig.
4. Size: As indicated on drawings.
5. Body: Bronze with chrome-plated finish for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and NPS 3.
6. Valves for Booster Heater Water Supply: Include integral bypass.
7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and NPS 3.

### 2.4 TEMPERATURE-ACTUATED WATER MIXING VALVES

#### A. Primary, Thermostatic, Water Mixing 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. Lawler Manufacturing Company, Inc.
  - c. Leonard Valve Company.
  - d. Powers; a Watts Industries Co.
  - e. Symmons Industries, Inc.
2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig.
4. Type: Cabinet-type, thermostatically controlled water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded **union** inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Valve Pressure Rating: 125 psig minimum, unless otherwise indicated.
9. Valve Finish: Chrome plated or rough bronze.
10. Piping Finish: Copper.
11. Cabinet: Factory-fabricated, stainless steel, for mounting and with hinged, stainless-steel door.

## 2.5 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: Metal bellows.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

## 2.6 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.

## 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 brakes 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. Install pressure gages on inlet and outlet.

- D. Install balancing valves in locations where they can easily be adjusted.
- E. Install water hammer arresters in water piping according to PDI-WH 201.
- F. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.
- G. 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."

### 3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:
  - 1. Test each reduced-pressure-principle backflow preventer and double-check backflow-prevention assembly 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.

### 3.3 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

END OF SECTION

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## SECTION 221316

### SANITARY WASTE AND VENT PIPING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following soil and waste, sanitary drainage and vent piping inside the building:
  - 1. Pipe, tube, and fittings.
  - 2. Special pipe fittings.

##### 1.2 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.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control inspection and test reports.

##### 1.4 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; and "NSF-drain" for plastic drain piping.

#### PART 2 - PRODUCTS

##### 2.1 PIPING MATERIALS

- A. Hub-and-Spigot, Cast-Iron Pipe and Fittings: ASTM A 74, Service class.
  - 1. Gaskets: ASTM C 564, rubber.
- B. Hubless Cast-Iron Pipe and Fittings: ASTM A 888 or CISPI 301.
  - 1. Solvent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.
  - 2. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
    - a. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
    - b. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
- C. Solid-Wall PVC Pipe: ASTM D 2665, solid-wall drain, waste, and vent.

1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.
2. Solvent Cement and Adhesive Primer:
  - a. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - b. 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).

## PART 3 - EXECUTION

### 3.1 PIPING APPLICATIONS

- A. Special pipe fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.
- B. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- C. Aboveground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
  1. Hubless cast-iron soil pipe and fittings and heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
  2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints. Not to be used in plenum spaces.
- D. Aboveground, soil, waste, and vent piping NPS 5 and larger shall be any of the following:
  1. Hubless cast-iron soil pipe and fittings and heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
  2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
- E. Underground in building (to 5 feet outside building), soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
  1. Service class, hub-and-spigot, cast-iron soil pipe and fittings; gaskets; and compression joints.
- F. Underground in building (to 5 feet outside building), 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 compression joints.

### 3.2 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- C. 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."
- D. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Wall penetration systems are specified in Division 22 Section "Common Work Results for Plumbing."
- E. 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."



- F. 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.
- G. 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.
- H. 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; 2 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.
- I. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- J. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.
- K. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

### 3.3 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
  - 1. Gasketed Joints: Make with rubber gasket matching class of pipe and fittings.
  - 2. Hubless Joints: Make with rubber gasket and sleeve or clamp.
- C. PVC Non pressure Piping Joints: Join piping according to ASTM D 2665.

### 3.4 HANGER AND SUPPORT INSTALLATION

- A. Seismic-restraint devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping & Equipment."
- B. Pipe hangers and supports are specified in Division 23 Section "Common Work Results for HVAC." Install the following:
  - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
  - 2. 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 23 Section "Common Work Results for HVAC."

- 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. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.
- 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.
- I. Install supports for vertical steel piping every 15 feet.
- J. Install hangers for 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 NPS 5: 48 inches with 5/8-inch rod.
  4. NPS 6: 48 inches with 3/4-inch rod.
- K. Install supports for vertical PVC piping every 48 inches.
- L. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

### 3.5 CONNECTIONS

- A. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- B. 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.

### 3.6 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.
  - 1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
  - 2. Prepare reports for tests and required corrective action.

### 3.7 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.

### 3.8 PROTECTION

- A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

SECTION 224000  
PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Faucets for lavatories and sinks.
  - 2. Flushometers.
  - 3. Toilet seats.
  - 4. Protective shielding guards.
  - 5. Fixture supports.
  - 6. Disposers.
  - 7. Water closets.
  - 8. Urinals.
  - 9. Lavatories.
  - 10. Kitchen sinks.
  
- B. Related Sections include the following:
  - 1. Division 22 Section "Drinking Fountains and Water Coolers."

1.2 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. FRP: Fiberglass-reinforced plastic.
- D. PMMA: Polymethyl methacrylate (acrylic) plastic.
- E. PVC: Polyvinyl chloride plastic.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Documentation indicating flow and water consumption requirements.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and maintenance data.

1.4 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 and ADA/USPS Handbook RE-4 for plumbing fixtures for people with disabilities.

- C. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- E. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- F. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
  - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
  - 2. Vitreous-China Fixtures: ASME A112.19.2M.
  - 3. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
- G. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
  - 1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
  - 2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
  - 3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.
  - 4. Faucets: ASME A112.18.1.
  - 5. Hose-Connection Vacuum Breakers: ASSE 1011.
  - 6. Hose-Coupling Threads: ASME B1.20.7.
  - 7. NSF Potable-Water Materials: NSF 61.
  - 8. Pipe Threads: ASME B1.20.1.
  - 9. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
  - 10. Supply Fittings: ASME A112.18.1.
  - 11. Brass Waste Fittings: ASME A112.18.2.
- H. 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. Manual-Operation Flushometers: ASSE 1037.
  - 4. Plastic Tubular Fittings: ASTM F 409.
  - 5. Brass Waste Fittings: ASME A112.18.2.
- I. Comply with the following applicable standards and other requirements specified for miscellaneous components:
  - 1. Disposers: ASSE 1008 and UL 430.
  - 2. Flexible Water Connectors: ASME A112.18.6.
  - 3. Grab Bars: ASTM F 446.
  - 4. Hose-Coupling Threads: ASME B1.20.7.
  - 5. Off-Floor Fixture Supports: ASME A112.6.1M.
  - 6. Pipe Threads: ASME B1.20.1.
  - 7. Plastic Toilet Seats: ANSI Z124.5.
  - 8. Supply and Drain Protective Shielding Guards: ICC A117.1.

## PART 2 - PRODUCTS

### 2.1 LAVATORY FAUCETS

- A. Lavatory Faucets:
  - 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. American Standard Companies, Inc.
    - b. Bradley Corporation.
    - c. Chicago Faucets.

- d. Delta Faucet Company.
  - e. Elkay Manufacturing Co.
  - f. Just Manufacturing Company.
  - g. Kohler Co.
  - h. Royal Brass Mfg. Co.
  - i. Speakman Company.
  - j. T & S Brass and Bronze Works, Inc.
  - k. Zurn Plumbing Products Group; Commercial Brass Operation.
2. Description: Single-handle-control mixing valve. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
- a. Body Material: Commercial, solid brass.
  - b. Finish: Polished chrome plate.
  - c. Maximum Flow Rate: 0.5 gpm.
  - d. Centers: 4 inches or Single hole as required.
  - e. Mounting: Deck, exposed.
  - f. Inlet(s): NPS 3/8 tubing, with NPS 1/2 male adaptor.
  - g. Spout: Rigid type.
  - h. Spout Outlet: Aerator, 0.5 gpm.
  - i. Drain: Grid.

## 2.2 SINK FAUCETS

### A. Sink Faucets:

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. American Standard Companies, Inc.
  - b. Bradley Corporation.
  - c. Broadway Collection.
  - d. Chicago Faucets.
  - e. Delta Faucet Company.
  - f. Elkay Manufacturing Co.
  - g. Just Manufacturing Company.
  - h. Kohler Co.
  - i. Royal Brass Mfg. Co.
  - j. Sayco; a Briggs Plumbing Products, Inc. Company.
  - k. Speakman Company.
  - l. T & S Brass and Bronze Works, Inc.
  - m. Zurn Plumbing Products Group; Commercial Brass Operation.
2. Description: Kitchen faucet without spray. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
- a. Body Material: Commercial, solid brass.
  - b. Finish: Polished chrome plate.
  - c. Maximum Flow Rate: 1.5 gpm.
  - d. Mixing Valve: Single control.
  - e. Centers: 4 inches or 8 inches, as required.
  - f. Mounting: Deck], exposed.
  - g. Handle(s): Lever.
  - h. Inlet(s): NPS 3/8 tubing with NPS 1/2 male adapter.
  - i. Spout Type: Swing, solid brass.
  - j. Spout Outlet: Aerator].

## 2.3 FLUSHOMETERS

### A. Flushometers:

224000 - 3

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. Coyne & Delany Co.
  - b. Sloan Valve Company.
  - c. Zurn Plumbing Products Group; Commercial Brass Operation.
  - d. TOTO USA, Inc.
  
2. Description: Flushometer for urinal and water-closet-type fixture. 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.
  - a. Internal Design: Diaphragm operation.
  - b. Style: Exposed.
  - c. Stops: Integral screwdriver stops.
  - d. Inlet Size: NPS 3/4 for urinals, NPS 1 for water closets.
  - e. Trip Mechanism: Oscillating, lever-handle actuator.
  - f. Consumption: 0.5 gal./flush for urinals, 1.28 gal./flush for water closets.
  - g. Tailpiece Size: NPS 3/4 for urinals, NPS 1-1/4 for water closets length to top of bowl.

## 2.4 TOILET SEATS

- A. Toilet Seats:
  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. Bemis Manufacturing Company.
    - b. Centoco Manufacturing Corp.
    - c. Church Seats.
    - d. Olsonite Corp.
  
  2. Description: Toilet seat for water-closet-type fixture.
    - a. Material: Molded, solid plastic with antimicrobial agent.
    - b. Configuration: Open front without cover.
    - c. Size: Elongated.
    - d. Hinge Type: SS, self-sustaining.
    - e. Class: Standard commercial.
    - f. Color: White.

## 2.5 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Pipe Covers:
  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. 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.
  
  2. 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.

## 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:

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.

B. Water-Closet Supports:

1. Description: Combination carrier designed for accessible mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical, or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

C. Urinal Supports:

1. Description: Type II, urinal carrier with hanger and bearing plates for wall-mounting, urinal-type fixture. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

D. Lavatory Supports:

1. Description: Type II, lavatory carrier with concealed arms and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet.
2. Accessible-Fixture Support: Include rectangular steel uprights.

## 2.7 DISPOSERS

A. Disposers:

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. Franke Consumer Products, Inc.; Kitchen Systems Div.
  - b. General Electric Company.
  - c. In-Sink-Erator; a div. of Emerson Electric Co.
  - d. KitchenAid.
  - e. Maytag Co.
2. Description: Batch-feed, food-waste disposer. Include reset button; wall switch; corrosion-resistant chamber with jam-resistant, cutlery- or stainless-steel grinder or shredder; NPS 1-1/2 outlet; quick-mounting, stainless-steel sink flange; antisplash guard; and combination cover/stopper.
  - a. Type: Batch-feed, stainless steel construction with lifetime lubrication and replaceable hammers and rind kicker.
  - b. Shock absorbing mounting
  - c. Model: [Not applicable] [Sound-insulated chamber] [Sound-insulated chamber and stainless-steel outer shell].
  - d. Motor: 115-V ac, 1725 rpm, 1 hp with overload protection.

## 2.8 WATER CLOSETS

A. Water Closets – Flush Valve Wall Mounted:

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. American Standard Companies, Inc.
  - b. Briggs Plumbing Products, Inc.
  - c. Crane Plumbing, L.L.C./Fiat Products.
  - d. Eljer.
  - e. Gerber Plumbing Fixtures LLC.
  - f. Kohler Co.



- g. TOTO USA, Inc.
  - 2. Description: Accessible, wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.
  - 3. Supply: NPS 1 chrome-plated brass or copper with screwdriver stop.
  - 4. Style: Flushometer valve.
    - a. Bowl Type: Elongated, siphon-jet design. Include bolt caps matching fixture.
    - b. Height: Standard or Accessible as indicated on drawings.
    - c. Design Consumption: 1.28 gal./flush.
    - d. Color: White.
  - 5. Flushometer
  - 6. Toilet Seat
- B. Water Closets – Tank Type Wall Mounted:
- 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. American Standard Companies, Inc.
    - b. Briggs Plumbing Products, Inc.
    - c. Crane Plumbing, L.L.C./Fiat Products.
    - d. Eljer.
    - e. Gerber Plumbing Fixtures LLC.
    - f. Kohler Co.
    - g. TOTO USA, Inc.
  - 2. Description: Accessible, wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.
  - 3. Supply: NPS 1/2" chrome-plated brass or copper with screwdriver stop.
  - 4. Style: Tank Type.
    - a. Bowl Type: Elongated, siphon-jet design. Include bolt caps matching fixture.
    - b. Height: Standard or Accessible as indicated on drawings.
    - c. Design Consumption: 1.28 gal./flush.
    - d. Color: White.
  - 5. Toilet Seat
- C. Water Closets – Tank Type Floor Mounted:
- 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. American Standard Companies, Inc.
    - b. Briggs Plumbing Products, Inc.
    - c. Crane Plumbing, L.L.C./Fiat Products.
    - d. Eljer.
    - e. Gerber Plumbing Fixtures LLC.
    - f. Kohler Co.
    - g. TOTO USA, Inc.
  - 2. Description: Accessible, floor mounted, bottom-outlet, vitreous-china fixture designed for flushometer valve operation.
  - 3. Supply: NPS 1/2" chrome-plated brass or copper with screwdriver stop.
  - 4. Style: Tank Type.
    - a. Bowl Type: Elongated, siphon-jet design. Include bolt caps matching fixture.
    - b. Height: Standard or Accessible as indicated on drawings.
    - c. Design Consumption: 1.28 gal./flush.
    - d. Color: White.
  - 5. Toilet Seat

## 2.9 URINALS

- A. Urinals:
  - 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. American Standard Companies, Inc.
  - b. Briggs Plumbing Products, Inc.
  - c. Crane Plumbing, L.L.C./Fiat Products.
  - d. Eljer.
  - e. Kohler Co.
  - f. TOTO USA, Inc.
2. Description: Accessible, wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.
- a. Type: Siphon jet.
  - b. Strainer or Trapway: Open trapway with integral trap. Stainless steel strainer
  - c. Design Consumption: 0.5 gal./flush.
  - d. Color: White.
  - e. Supply Spud Size: NPS 3/4.
  - f. Outlet Size: NPS 3.
  - g. Flushometer:
  - h. Fixture Support: Urinal carrier.

## 2.10 LAVATORIES

### A. Lavatories:

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. American Standard Companies, Inc.
  - b. Eljer.
  - c. Kohler Co.
  - d. Briggs Plumbing Products, Inc.
  - e. Crane Plumbing, L.L.C./Fiat Products.
  - f. Eljer.
  - g. Gerber Plumbing Fixtures LLC.
  - h. TOTO USA, Inc.
2. Description: Accessible, wall fixture.
- a. Type: With back.
  - b. Size: 20 by 18 inches minimum, rectangular.
  - c. Faucet Hole Punching: Three holes, 4-inch centers.
  - d. Faucet Hole Location: Top.
  - e. Color: White.
  - f. Faucet: Lavatory with grid drain.
  - g. Supplies: NPS 3/8 chrome-plated copper with stops.
  - h. Protective Shielding Guard(s): Where designated.
  - i. Fixture Support: Lavatory concealed arm carrier.

## 2.11 KITCHEN SINKS

### A. Kitchen Sinks:

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. Dayton Products, Inc.
  - b. Elkay Manufacturing Co.
  - c. Franke Consumer Products, Inc., Kitchen Systems Div.
  - d. Just Manufacturing Company.
  - e. Kohler Co.
  - f. Moen, Inc.
  - g. Revere Sink.
  - h. Sterling Plumbing Group, Inc.
2. Description: One-compartment, counter-mounting, stainless-steel kitchen sink.
- a. Overall Dimensions: 25 x 22 x 8.

- b. Metal Thickness: 0.050 inch
- c. Bowl:
  - 1) Drain: 3-1/2-inch crumb cup, outlet for disposer.
  - 2) Location: Centered in bowl.
- d. Sink Faucet:
- e. Supplies: NPS 1/2 chrome-plated copper with stops.
- f. Drain Piping: NPS 1-1/2 chrome-plated, cast-brass P-trap; 0.045-inch- thick tubular brass waste to wall; continuous waste; and wall escutcheon(s).
- g. Disposer: As designated.

## PART 3 - EXECUTION

### 3.1 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. Install wall-mounting fixtures with tubular waste piping attached to supports.
- E. Install fixtures level and plumb according to roughing-in drawings.
- F. 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.
- G. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- H. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- I. 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.
- J. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- K. Install toilet seats on water closets.
- L. 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.
- M. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- N. 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.
- O. Install traps on fixture outlets.
  - 1. Exception: Omit trap on fixtures with integral traps.
  - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.

- P. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- Q. Install escutcheons at piping wall and 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."
- R. 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."

### 3.2 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."

### 3.3 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.

### 3.4 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 Owner.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

## SECTION 224700

### DRINKING FOUNTAINS AND WATER COOLERS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Type PB, pressure with bubbler, Style W, wall-mounting water coolers.
  - 2. Fixture supports.

##### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and maintenance data.

##### 1.3 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 and ADA/USPS Handbook RE-4 for plumbing 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.

#### PART 2 - PRODUCTS

##### 2.1 PRESSURE WATER COOLERS

- A. Water Coolers:
  - 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. Elkay Manufacturing Co.
    - b. Halsey Taylor.
    - c. Haws Corporation.
    - d. Larco, Inc.

- e. Oasis Corporation.
  - f. Sunroc Corp.
2. Description: Electric Water Cooler, Wall Hung with Bottle Filling Station
- a. Cabinet: Vinyl-covered steel with stainless-steel top.
  - b. Bubbler: One, with adjustable stream regulator, located on deck.
  - c. Control: Push button.
  - d. Supply: NPS 3/8 with ball, gate, or globe valve.
  - e. Filter: One or more water filters complying with NSF 42 and NSF 53 for cyst and lead reduction to below EPA standards; with capacity sized for unit peak flow rate.
  - f. Drain: Grid with NPS 1-1/4 minimum horizontal waste and trap complying with ASME A112.18.2.
  - g. Cooling System: Electric, hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.
  - h. Capacity: 8 gph of 50 deg F cooled water from 80 deg F inlet water and 90 deg F ambient air temperature.
  - i. Electrical Characteristics: 120-V ac; single phase; 60 Hz.
  - j. Support: Type II, water cooler carrier. Refer to "Fixture Supports" Article.

## 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:
- 1. Josam Co.
  - 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.
- B. Description: ASME A112.6.1M, water cooler carriers. Include vertical, steel uprights with feet and tie rods and bearing plates with mounting studs matching fixture to be supported.
- 1. Type I: Hanger-type carrier with two vertical uprights.
  - 2. Type II: Bilevel, hanger-type carrier with three vertical uprights.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Use carrier off-floor supports for wall-mounting fixtures, unless otherwise indicated.
- B. Use chrome-plated brass or copper tube, fittings, and valves in locations exposed to view.

### 3.2 INSTALLATION

- A. Install off-floor supports affixed to building substrate and attach wall-mounting fixtures, unless otherwise indicated.
- B. Install fixtures level and plumb. For fixtures indicated for children, install at height required by authorities having jurisdiction.

- C. 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."
- D. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- E. 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."
- F. 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."

### 3.3 CONNECTIONS

- A. Connect fixtures with water supplies, traps, and risers, and with soil, waste, and vent piping. Use size fittings required to match fixtures.
- 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."

### 3.4 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.

### 3.5 ADJUSTING

- A. Adjust fixture flow regulators for proper flow and stream height.
- B. Adjust water cooler temperature settings.

END OF SECTION

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## SECTION 260500

### COMMON WORK RESULTS FOR ELECTRICAL

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes:
  - 1. Basic electrical methods.
  - 2. Grounding and bonding.
  - 3. Hangers and supports.
  - 4. Electrical identification.
  - 5. Motor starters, controls, and connections to mechanical equipment.
  - 6. Electrical system testing and inspection.
  
- B. Related Documents: The contract documents, as defined in Section 011000 – Summary of Work, apply to the work of this section. Additional requirements and information necessary to complete the work of this section may be found in other documents.
  
- C. Related Sections:
  - 1. Section 019113 - General Commissioning Requirements
  - 2. Section 024113 - Selective Site Demolition
  - 3. Section 078400 - Firestopping
  - 4. Section 220500 - Common Work Results for Plumbing
  - 5. Section 230500 - Common Work Results for HVAC
  - 6. Section 251104 - Metering Devices
  - 7. Section 251304 - Facility System Integration into EEMS
  - 8. Section 260513 - Medium Voltage Cables
  - 9. Section 260519 - Low-Voltage Electrical Power Conductors and Cables
  - 10. Section 260533 - Raceway and Boxes for Electrical Systems
  - 11. Section 260623 - Lighting Control Devices
  - 12. Section 262200 - Low Voltage Transformers
  - 13. Section 262413 - Switchboards
  - 14. Section 262416 - Panelboards
  - 15. Section 262726 - Wiring Devices
  - 16. Section 262816 - Enclosed Switches and Circuit Breakers
  - 17. Section 264128 - Surge Protective Devices (SPD's)
  - 18. Section 265100 - Interior Lighting (LED - Solid State)
  - 19. Section 265600 - Exterior Lighting
  - 20. Section 312000 - Earth Moving
  - 21. Section 312300 - Excavation and Fill
  - 22. Section 337173 - Electrical Utility Services

##### 1.2 REFERENCES

- A. National Electrical Contractors Association (NECA):
  - 1. NECA SI - Standard of Installation.
  
- B. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA KS 1 - Enclosed Switches.
  
- C. National Electrical Testing Association (NETA):



1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code.

### 1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Procedures for submittals.

1. Product Data:
  - a. Grounding electrodes and connections.
  - b. Starter electrical characteristics and connection requirements.
2. Assurance/Control Submittals:
  - a. Electrical System Test Reports: Submit report including the following directly to the USPS Project Manager from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.
  - b. Summary of project.
  - c. Description of equipment tested.
  - d. Description of test.
  - e. Test results.
  - f. Conclusions and recommendations.
  - g. Appendix, including appropriate test forms.
  - h. List of test equipment used and calibration date.
  - i. Signature of responsible Testing Laboratory Officer.
  - j. Certificates: Manufacturer's certificate that each Product specified meet or exceed specified requirements.
  - k. Qualification Documentation: Submit documentation of experience indication compliance with specified qualification requirements.

B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.

1. Project Record Documents: Accurately record the following.
  - a. Locations of components and grounding electrodes.

### 1.4 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing Work of this Section with minimum 5 years documented experience.

B. Regulatory Requirements:

1. Products: Listed and classified by Underwriters Laboratories, Incorporated as suitable for the purpose specified and indicated.
2. Work herein shall conform to all applicable laws, ordinances and regulations in accordance with the latest applicable requirements of:
  - a. The National Electrical Code (NFPA 70).
  - b. National Electrical Manufacturer's Associates.
  - c. Standards of National Fire Protection Association (NFPA 72, 90A and 101).
  - d. Underwriter's Laboratories.
  - e. Occupational Safety and Health Agency Standards.
  - f. Illuminating Engineering Society Handbook.
  - g. The International Existing Building Code.
  - h. The International Electrical Code.
  - i. ASHRAE Standard 90.1.
  - j. The International Energy Conservation Code.

## 1.5 BASIC ELECTRICAL METHODS

- A. Drawings are schematic and diagrammatic. Use judgment and care to install electrical Work to function properly and fit within building construction and finishes. Electrical conductors, conduit, components, not shown or specified, which are required for any device or system to produce a complete and operative system are required to be furnished and installed.
- B. Exact location of outlets is determined from dimension on Drawings, manufacturer's shop drawings, or as may be determined at Project Site. Do not scale Drawings for exact location of any item. Verify item mounting heights as required by project conditions prior to rough-in.
- C. Route conduits and wiring associated with new equipment and systems above ceilings, in existing chases, and concealed within building structure.
- D. Surface mounted raceways or conduit permitted only at locations indicated on Drawings.
- E. Circuit grouping, conduit or cable runs and home runs are indicated with number of conductors shown in each raceway to clarify operation and function of various systems. Provide proper number of conductors and conduits or cables to provide operative system as indicated on Contract Documents. Do not regroup any feeder circuits, branch circuits, home runs, and zone alarms at any point, from that shown on Contract Documents. Each conduit run shall contain no more than (6) current carrying conductors.
- F. Branch and home run circuits are indicated as 2, 3, or 4 wire circuits unless otherwise noted. Do not connect two ungrounded conductors to same circuit breaker/fused switch in any panel. Circuit runs consist of a maximum of five conductors; 3 phase conductors, 1 neutral conductor, and 1 equipment ground conductor, unless otherwise noted. Do not splice branch circuit conductors in any panels, safety switches, or circuit breakers in separate enclosures.
- G. The sharing of neutral conductors for multiwire branch circuits is prohibited. All branch circuits shall contain individual neutrals.
- H. Proposed equipment, switches or devices, shown mounted on and/or adjacent to equipment, which if installed, would impair proper operation of existing or new equipment, shall be removed and relocated by Contractor as required so equipment will function properly. Notify Contracting Officer immediately if any such condition exists.
- I. Seal and make permanently watertight penetrations by electrical raceways or equipment through ceilings, walls or floors.
  - 1. Seal penetrations in non-fire rated ceilings, walls or floors material specified in Section 079200 – Joint Sealants.
  - 2. Seal penetrations in fire rated walls with material specified in Section 078400 - Firestopping.
- J. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A, and NFPA 70.
- K. Install equipment and materials to provide required maintenance and code working clearance for servicing and maintenance. Coordinate final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow required space for removal of parts that require replacement or servicing.
- L. Remove existing equipment, lighting fixtures, switches, and receptacles as required to facilitate proposed installation and as specified in Section 024119 - Selective Structure Demolition. Remove existing wiring and conduit serving items to be removed. Conduit in inaccessible areas shall be cut off below finished surfaces and existing surface patched to match existing. Provide blank plates on existing flush mounted outlet boxes that will be abandoned. Remove all abandoned conductors from raceways.

## PART 2 - PRODUCTS

### 2.1 GROUNDING AND BONDING

- A. Grounding System Resistance: Five ohm.
- B. Rod Electrodes:
  - 1. Material: Copper.
  - 2. Diameter: 3/4 inch.
  - 3. Length: 10 feet.
- C. Mechanical Connectors: Bronze.
- D. Electrode Conductor:
  - 1. Material: Bare stranded copper.
  - 2. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.
- E. Electrode Access Well Components:
  - 1. Pipe: 12 inch diameter by 12 inch long PVC access well.
  - 2. Cover: Cast iron with legend "GROUND" embossed on cover.
  - 3. Harger #362PS12CILS80,

### 2.2 HANGERS AND SUPPORTS

- A. Product Requirements: Furnish and install approved materials, sizes, and types of anchors, fasteners, and supports to carry loads of equipment and conduit, including weight of wire in conduit plus 300 pounds.
- B. Materials and Finishes: Corrosion resistive.
- C. Anchors and Fasteners:
  - 1. Steel Structural Elements: Beam clamps and welded fasteners.
  - 2. Concrete Surfaces: Self-drilling anchors and expansion anchors.
  - 3. Hollow Masonry, Plaster, and Gypsum Board Partitions: Toggle bolts and hollow wall fasteners.
  - 4. Solid Masonry Walls: Expansion anchors.
  - 5. Sheet Metal: Sheet metal screws.
  - 6. Wood: Wood screws.

### 2.3 ELECTRICAL IDENTIFICATION

- A. Nameplates:
  - 1. Engraved three-layer laminated phenolic plastic, white letters on black background.
  - 2. Locations:
    - a. Each electrical distribution and control equipment enclosure.
    - b. Communication cabinets.
    - c. Terminal Cabinets.
    - d. Individual motor starter.
    - e. Separately enclosed circuit breakers.
    - f. Panelboards
    - g. Transformers.
    - h. Pull boxes.
    - i. Lighting contactor/control panel enclosure.
    - j. Relays.
    - k. Switches and disconnects.

3. Letter Size:
    - a. Use 1/8 inch letters for identifying individual equipment and loads.
    - b. Use 1/4 inch letters for identifying grouped equipment and loads.
  4. Nameplates shall indicate voltage of the equipment and the source of power from the upstream device or equipment.
- B. Wire and Cable Markers:
1. Description: Cloth tape or tubing type wire markers.
  2. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.
  3. Identification:
    - a. Power and Lighting Circuits: Branch circuit or feeder number indicated on Drawings.
    - b. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on Drawings.
    - c. Communications Cable: Per section 270500.
- C. Conduit Markers:
1. Underground conduit routings shall be marked utilizing magnetic marker tape set atop of the entire conduit run.
    - a. Underground-Type Plastic Line Marker: Manufacturer's standard detectable permanent, bright colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6 inches wide by 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried cable. Locate tape 12 inches above top of conduit.
  2. Detectable marker tape cannot be installed atop of directionally bored underground conduits. Directionally bored conduits containing only fiber cabling shall therefore be equipped with a #12/AWG copper conductor to enhance detection.
- D. Arc Flash Warning Signs: Furnish signs in accordance with NEC Article 110.16, warning of potential arc flash hazard and requiring suitable Personal protective equipment. Locate and install signs per INSTALLATION Section of this specification.
- E. Confined space markings: Work within electrical manholes and underground vaults must comply with "confined space" OSHA requirements. Manhole covers and the entrance to underground vaults shall be stamped or marked as "CONFINED SPACE – PERMIT REQUIRED".
- F. Receptacles and Switches: All coverplates for receptacles and switches shall be labeled with the branch circuit number. Label shall be machine generated and permanently affixed to the outside of the coverplate.

## 2.4 MOTOR STARTERS, CONTROLS, AND CONNECTIONS TO MECHANICAL EQUIPMENT

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
1. ABB/G.E. Industrial Solutions (ABB/GEIS), Mebane, NC (800) 431-7867.
  2. Allen-Bradley Company, Milwaukee, WI (414) 382-2000.
  3. Cutler-Hammer Eaton Corp, Milwaukee, WI (800) 833-3927.
  4. Square D Company, Palatine, IL (847) 397-2600.
  5. Siemens Energy and Automation, Alpharetta, GA (800) 964-4114.
  6. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Motor Starters
1. Provide manual, single phase, 120/277V, toggle type, motor rated switches with thermal overload element (sized at 115 percent of full load current) for fractional horsepower motors not requiring automatic control interfaces.

2. Provide across-the-line, AC magnetic motor starters in applications where controls other than manual on and off are involved. Motor starters shall be UL labeled. Provide starters with the following features:
    - a. Rating for the voltage and current imposed.
    - b. Enclosure for the application usage: NEMA 1 for dry, indoors, NEMA 3R for outdoors, etc.
    - c. Control circuit voltage and amperage to match coil voltage and ratings of control apparatus.
    - d. Control transformers with primary and secondary fusing for control circuits, as required.
    - e. Overload elements for every conductor leg above ground. Elements are to be "thermal alloy" type, resettable and properly sized to motor nameplate rating. Elements located near boilers, heat strips, duct heaters or other heat sources or where heating by conduction or radiation can occur, shall be ambient temperature compensated types.
    - f. Adjustable phase loss/phase reversal protection (0-15 seconds), factory set at 7 seconds and a minimum of two field convertible auxiliary contacts.
    - g. Cover-mounted control switch is to be a "start-stop" or "hand-off-auto" type with "running" and "auto" pilot lights, as required by the control sequence. A suitable reset device for manually resetting overcurrent trip shall be provided.
  3. Starters for motors 10 hp or less shall be connected to automatically return the motor to service after a power interruption. Starters for motors over 10 hp shall be equipped with time delay relays so that after a power resumption and after a preset delay of 0-30 seconds, the motor shall automatically be returned to service.
  4. Combination magnetic motor starter/fused disconnect unit shall be utilized wherever possible.
- C. Furnish and Install the Following:
1. Conduit, wiring and electrical connections to motors, safety switches, starters, relays, electrical interlock circuits, valves, unit heaters, fan coil units, air handling units, and other similar equipment, required for complete and ready for operation. Coordinate with and review other sections of the specifications describing electrical equipment in order to fully understand the wiring requirements.
  2. Starters as indicated on Drawings except factory provided starters such as those physically mounted on the unit or any piece of equipment where starter is furnished as an integral part of the equipment.
  3. Electrical line voltage control components and installation as specified in Division 26 Sections.
  4. Furnish and install low voltage (below 50 volts) control wiring as indicated on Drawings using metallic conduit and No. 12 type THHN wire, minimum.
- D. Refer to Drawings for quantity and size of motor starters.
- E. Individual and group mounted motor starters within motor control centers and those starters factory provided integral with the equipment shall be furnished in accordance with paragraph 2.4 B.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to the USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION - GROUNDING AND BONDING

- A. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- B. Provide grounding well pipe with cover at each rod location. Install well pipe top flush with finished grade or surface.
- C. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing, building steel above grade and metallic cold water pipe.
- D. Provide bonding and grounding in conformance with NFPA 70.
- E. Equipment Grounding Conductor: Provide separate, insulated conductor within all lighting and power raceways. Terminate each end on suitable lug, bus, or bushing.
- F. Testing and Inspection:
  - 1. Inspect and test in accordance with NETA ATS, where applicable.
  - 2. Perform inspections and tests listed in NETA ATS, Section 7.13.
  - 3. Test ground resistance of system with clamp-on ground resistance tester. The resistance of the grounding system shall not exceed 5 ohms. Where tests show resistance-to-ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms, or less, by driving additional ground rods, lengthening the rods or installing ground enhancing materials; then retest to demonstrate compliance. Install rods at least 8 feet apart.

### 3.3 INSTALLATION - HANGERS AND SUPPORTS

- A. Install products in accordance with manufacturer's published instructions.
- B. Furnish and install anchors, fasteners, and supports in accordance with NECA SI.
- C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- D. Do not use spring steel clips and clamps.
- E. Do not use powder-actuated anchors.
- F. Obtain permission from structural engineer before drilling or cutting structural members.
- G. Fabricate supports from structural steel angle or structural steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- I. In wet and damp locations use structural steel channel supports to stand cabinets and panelboards one inch off wall.
- J. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

### 3.4 INSTALLATION - ELECTRICAL IDENTIFICATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using stainless steel screws. Use minimum two screws at each end of nameplate.
- C. Secure nameplate to outside surface of door on panelboards and switchboards.
- D. Install Arc Flash Warning Signs on switchboards, panelboards, control panels, meter socket enclosures, and motor control centers likely to require examination, adjustment, servicing, or maintenance while energized. Locate sign so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

### 3.5 INSTALLATION – MOTOR STARTERS, CONTROLS, AND CONNECTIONS TO MECHANICAL EQUIPMENT

- A. Verify and check equipment manufacturer's nameplate and installation instructions to obtain exact location of outlets for equipment before installation.
- B. Wire and connect line voltage controls in accordance with approved wiring diagrams. Provide line voltage interlock and control wiring as indicated on Drawings using conduit and No. 12 type THHN wire.

### 3.6 FIELD QUALITY CONTROL - ELECTRICAL TESTING AND INSPECTION

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Section 260800 - Commissioning of Electrical Systems: Requirements related to Division 26 Commissioning
- C. Conduct testing to Determine that Electrical Equipment and Systems:
  - 1. Are in conformance with Contract Documents and applicable reference standards.
  - 2. Is properly installed without damage due either to installation or shipment.
  - 3. Operate correctly, meet design intent, and are performing at optimum level, in safe manner.
- D. Provide a complete written record of operational values to be used as a baseline for future operational testing.
- E. Instrumentation:
  - 1. Provide calibration program that assures applicable test instrumentation is maintained within rated accuracy and directly traceable to National Bureau of Standards.
  - 2. Calibrate instruments in accordance with following frequency schedule:
    - a. Field Instruments:
    - b. Analog - 6 months maximum.
    - c. Digital - 12 months maximum.
    - d. Leased Specialty Equipment: 12 months. (Where accuracy is guaranteed by lessor.)
  - 3. Dated Calibration Labels: Visible on test equipment.
  - 4. Keep records current; Show date and result of instruments calibrated or tested.
  - 5. Maintain current instrument calibration instruction and procedure for each test instrument.
  - 6. Calibrating Standard: Higher accuracy than that of instrument being calibrated.
- F. Regulatory Requirements:
  - 1. Safety Practices: Include, but not limited to, the following requirements:
    - a. Occupational Safety and Health Act of 1970 - OSHA.

- b. Accident Prevention Manual for Industrial Operations, Seventh Edition, National Safety Council, Chapter 4.
  - c. Applicable State and Local Safety Operating Procedures.
  - d. NETA Safety/Accident Prevention Program.
  - e. United States Postal Service Safety Practices.
  - f. NFPA 70E - Electrical Safety Requirements for Employee Workplace.
  - g. American National Standards for Personnel Protection, ANSI Z244.1.
2. Perform tests with apparatus de-energized except where otherwise specifically required herein.
  3. Testing Laboratory: Provide a designated safety representative present at Project Site and supervise safety operations.
  4. Power Circuits: Conductors shorted to ground by a hot line grounded device approved for the purpose.
  5. Do not proceed until safety representative has determined that it is safe to do so.
  6. Testing Laboratory: Provide sufficient protective barriers and warning signs to conduct specified tests safely.
- G. Tests and inspections include, but are not limited to the following:
1. Proper operation of lights and equipment.
  2. Continuity of raceway system.
  3. Insulation leakage and impedances.
  4. Ground system resistance.
  5. Elimination of reverse rotation and single-phasing of motors.
  6. Sub-system tests indicated in other Sections.
  7. Proper operation of communications systems specified in Section 270500.
  8. Proper operation of intrusion detection systems specified in Section 281600.
  9. Proper operation of video surveillance system specified in Section 282305.
  10. Proper operation of fire alarm system specified in Section 283100.
- H. Load balance all electrical phases, at device, panels, and switchboards.
- I. Perform electrical system testing and inspection as specified in each related Section and as specified in this Section.

END OF SECTION

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## SECTION 260519

### LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

#### PART 1 - GENERAL

##### 1.1 SUMMARY:

- A. Section Includes:
  - 1. Building wire and cable.
  - 2. Branch-circuit cable.
  - 3. Wiring connectors and connections.
  - 4. Drop cords.
  - 5. Busways.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. As specified in Section 260500 - Common Work Results for Electrical: Basic electrical methods.

##### 1.2 REFERENCES

- A. As specified in Section 260500 – Common Work Results for Electrical.

##### 1.3 SUBMITTALS

- A. As specified in Section 260500 - Common Work Results for Electrical.

##### 1.4 QUALITY ASSURANCE

- A. As specified in Section 260500 – Common Work Results for Electrical.

##### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Deliver in accordance with NEMA WC 26.

#### PART 2 - PRODUCTS

##### 2.1 BUILDING WIRE AND CABLE

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Alcan Cable, Atlanta, GA (770) 392-2376.
  - 2. Anixter, Inc., Skokie, IL (800) ANIXTER.
  - 3. General Cable, Highland Heights, KY (800) 526-4391.

4. General Electric, Plainville, CT (860) 747-7111.
5. Okonite, Ramsey, NJ (201) 825-0300.
6. Southwire Company, Carrollton, GA (800) 444-1700.
7. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

B. Description: Single conductor insulated wire.

C. Conductor: Copper, except conductors #1/0 AWG and larger may be compact stranded aluminum if equipped with compression lugs and installed per manufacturer's recommendations and the National Electrical Code.

D. Insulation Voltage Rating: 600 Volts.

E. Insulation: NFPA 70, Type THHN/THWN or Type XHHW-2.

F. Multiconductor cable: Metal clad cable, Type MC with ground wire.

1. Type "MC" cable shall be permitted for use in exposed or accessible ceiling spaces only. Type "MC" cable shall not be utilized above inaccessible hard ceilings or in damp locations. Cable shall be supported and secured where such support does not exceed 3 ft. intervals and shall be properly color coded to identify phase, neutral, ground and switch legs.

## 2.2 WIRING CONNECTORS

A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:

1. Buchanan Construction Products, Hackettstown, NJ (800) 610-5201.
2. Thomas and Betts, Memphis, TN (800) 695-1901.
3. 3M, St. Paul, MN (800) 364-3577.
4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

B. Compression Connectors; Conductor sizes #12 through #6 AWG:

1. Buchanan: 2006S or 2011S.
2. Thomas and Betts
3. 3M

## 2.3 DROP CORDS

A. Description: Continuous length of cable with 20 Amp, 120 Volt locking blade type connector body at one end as indicated on Drawings. Secure cable at both ends with wire type stainless steel cable grips to prevent transmission of tension directly to conductors or terminal screws.

B. Junction Box: Furnished and installed flush with ceiling anchored to building structure for fastening of upper cord grip.

C. Cable: Type SO 600 Volt flexible cord with three #12 stranded wires.

D. Connector Body: Single 20 Amp, 120 Volt, grounding receptacle of twist-lock type at one end and straight blade type at other end that grips on cable insulation and is manufactured for use with wire cable grips. Furnish and install drop cords in length required for a receptacle height of 6 feet 8 inches above finished floor.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. As specified in Section 260500 – Common Work Results for Electrical.

### 3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

### 3.3 INSTALLATION - CONDUCTORS

- A. Wiring methods:
  - 1. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN or Type XHHW-2 insulation in metallic raceway or MC multiconductor cable.
  - 2. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or Type XHHW-2 insulation in metallic raceway or MC multiconductor cable.
  - 3. Above Accessible Ceilings: Use only building wire, Type THHN/THWN or Type XHHW-2 insulation in metallic raceway or MC multiconductor cable.
  - 4. Wet or Damp Interior Locations: Use only building wire, Type THW or THWN or Type XHHW-2 insulation in raceway.
- B. Install products in accordance with manufacturers published instructions and NECA SI.
- C. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- D. Use stranded conductors for control circuits and final connections to all vibration equipment.
- E. Use conductor not smaller than 12 AWG for power and lighting circuits.
- F. Use conductor not smaller than 14 AWG for control circuits.
- G. Use 10 AWG conductors for 20 ampere, 120 Volt branch circuits longer than 75 feet.
- H. Use 10 AWG conductors for 20 ampere, 277 Volt branch circuits longer than 200 feet.
- I. Pull all conductors into raceway at same time.
- J. Use approved wire pulling lubricant for all building wire.
- K. Protect exposed cable from damage.
- L. Neatly train and lace wiring inside boxes, equipment, and panelboards in accordance with NECA Standards.
- M. Clean conductor surfaces before installing lugs and connectors.
- N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- O. For splices and taps, use only compression connectors for copper or aluminum conductors, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
  - 1. Splicing of copper feeder conductors #3 AWG and larger is prohibited.

2. Splicing of aluminum feeder conductors #1 AWG and larger is prohibited.
  3. Splices within branch circuit or feeder conductors located underground or below grade shall not be provided. All splices shall be terminated above grade.
- P. Use solderless pressure compression connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- Q. Use conductors rated 90 degrees C, inside a ballast compartment or within 6 inches of any ballast.
- R. Conductor Sizes #8 and Larger: Class B stranding.
- S. Install Drop Cords to building structure at locations indicated on Drawings as indicated on Drawings.
- T. The sharing of neutral conductors for multiwire branch circuits is prohibited. All branch circuits shall contain individual neutral conductors.

### 3.4 CONSTRUCTION

- A. Interface with Other Work:
1. Identify wire and cable using Thomas and Betts type WM vinyl markers.
  2. Identify each conductor with its circuit number or other designation indicated on Drawings in all junction, pull, terminal boxes and cabinets. Identify neutrals with common circuit numbers in all junction, pull and terminal boxes, panels and cabinets.

### 3.5 WIRING COLOR CODE

- A. Comply with the following color code for each voltage system.
- B. 208Y/120 Volt System:
1. Phase A - Black.
  2. Phase A Switch Leg - Black with "S" tag.
  3. Phase B - Red.
  4. Phase B Switch Leg - Red with "S" tag.
  5. Phase C - Blue.
  6. Phase C - Switch Leg - Blue with "S" tag.
  7. Travelers - Yellow.
  8. Neutral - White.
  9. Equipment Ground - Green.
- C. 240/120 Volt System:
1. Phase A - Black.
  2. Phase A Switch Leg - Black with "S" tag.
  3. Phase B - Orange (High-Leg).
  4. Phase C - Blue.
  5. Phase C Switch Leg - Blue with "S" tag.
  6. Travelers - Yellow.
  7. Neutral - White.
  8. Equipment Ground - Green.
- D. 480Y/277 Volt System:
1. Phase A - Brown.
  2. Phase A Switch Leg - Brown with "S" Tag.
  3. Phase B - Orange.
  4. Phase B Switch Leg - Orange with "S" Tag.
  5. Phase C - Yellow.

6. Phase C Switch -Leg- Yellow with "S" Tag.
  7. Travelers - Yellow with "T" Tag.
  8. Neutral - Grey.
  9. Equipment Ground - Green with Yellow stripe.
- E. Use same color for same phase throughout. Use same colors for switch legs. Travelers shall be yellow. Phase rotation shall be same in all panels. Identify large cables with colored tape.
- F. Provide identification tags on each conductor entering panel, switch, junction box and pull box to identify conductor.

### 3.6 FIELD QUALITY CONTROL

- A. As specified in Section 260500 – Common Work Results for Electrical.
- B. Cables, 600 Volt or less and size no. 3 or larger, shall be meggered using an industry-approved “megger with a minimum of 500 Volt internal generating voltage. All inspection, cleaning and testing procedures shall be in compliance with the recommendations and standards outlined in the “maintenance testing specifications for electrical power distribution equipment and systems”, latest edition, published by International Electrical Testing Association (NETA). Insulation resistance test values shall be no less than 250 megaohms. A typewritten report of all readings shall be prepared and submitted.

END OF SECTION

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## SECTION 260533

### RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Metal conduit.
2. Flexible metal conduit.
3. Liquidtight metal conduit.
4. Electrical metallic tubing.
5. Fittings and conduit bodies.
6. Wall and ceiling outlet boxes.
7. Pull and junction boxes.
8. Cable trays.
9. Floor boxes with covers (other uses.)

###### B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

###### C. Related Sections:

1. Section 230500 – Common Work Results for HVAC.
2. Section 260500 – Common Work Results for Electrical.
3. Section 262726 – Wiring Devices.
4. Section 270500 – Common Work Results for Communication.
5. Section 281304 – Enterprise Physical Access Control System (ePACS).
6. Section 281600 – Intrusion Detection.
7. Section 282305 – Integrated Security and Investigative Platform (ISIP) CCTV System.
8. Section 283100 – Fire Emergency Voice/ Alarm Communication System (EVACS).
9. Section 312000 - Earth Moving.
10. Section 312300 - Excavation and Fill.

##### 1.2 REFERENCES

###### A. American Society for Testing and Materials (ASTM):

1. ASTM A 123 - Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.

###### B. American National Standards Institute (ANSI):

1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
3. ANSI C80.5 - Rigid Aluminum Conduit.

###### C. National Electrical Contractors Association (NECA):

1. NECA "Standard of Installation."

###### D. National Electrical Manufacturers Association (NEMA):

1. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
2. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
3. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

4. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
5. NEMA VE 1 - Metallic Cable Tray Systems.

- E. National Fire Protection Association (NFPA):
1. NFPA 70 - National Electrical Code.

### 1.3 SYSTEM DESCRIPTION

- A. Design Requirements
1. Conduit Size: NFPA 70, unless indicated otherwise on Drawings.

### 1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
1. Conform to requirements of NFPA 70.
  2. Provide products listed and classified by Underwriters Laboratories, Incorporated.

### 1.5 PROJECT OR SITE CONDITIONS

- A. Existing Utilities: Contact local utility companies and make arrangements to obtain utility company location and marking service prior to start of Work.
1. Locate existing underground utilities in areas of Work using "Ground Penetrating Radar (GPR)" detection. If utilities are to remain in place, provide means of support and protection during trenching and excavation operations.
    - a. Pothole and locate existing underground utilities at locations to assure that no conflict with Work of this Contract will occur and required clearance is available to prevent damage to existing utilities.
    - b. Perform potholing minimum 10 days before start of excavation or underground work.
  2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility company and Contracting Officer immediately for directions.
  3. Coordinate with Contracting Officer and utility companies to keep existing utility services and facilities in operation.
  4. Repair damaged utilities to satisfaction of utility company, at no additional cost to U.S. Postal Service.
  5. Do not interrupt existing utilities serving facilities occupied and used by U.S. Postal Service or others, during occupied hours, except when permitted in writing by Contracting Officer and then only after acceptable temporary utility services have been provided and approved by Contracting Officer.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Accept conduit on site. Contractor inspect for damage prior to acceptance.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

## PART 2 - PRODUCTS

### 2.1 CONDUIT REQUIREMENTS

- A. Where conduit is required by standards, codes, or required elsewhere, minimum size shall be as follows:
  - 1. 3/4 inch for power and branch circuit wiring, unless indicated otherwise. All homerun conduits shall be 3/4 inch, minimum.
  - 2. 3/4 inch for communications cable, unless indicated otherwise.
  - 3. 3/4 inch for low voltage, control, intercom, security and communications unless indicated otherwise.
  - 4. Underground conduits shall be sized 1 inch, minimum.

### 2.2 METAL CONDUIT

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Allied Tube & Conduit, Harvey, IL (800) 882-5543.
  - 2. Wheatland Tube Co., Collinswood, NJ (800) 257-8182.
  - 3. Republic Wire & Cable, Rocky Mount, NC (800) 533-8198.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Rigid Galvanized Steel Conduit (GRC): ANSI C80.1, UL6.
- C. Intermediate Metal Conduit (IMC): UL1242.
- D. Fittings and Conduit Bodies: NEMA FB1 Material to match conduit.

### 2.3 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Hubbell, Millford, CT (203) 882-4800.
  - 2. Electriflex, Roselle, IL (800) 323-6174.
  - 3. 0-Z/Gedney, Farmington, CT (860) 677-5541.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Description: Interlocked steel and aluminum construction.
- C. Fittings: NEMA FB 1.

### 2.4 LIQUID-TIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Hubbell, Millford, CT (203) 882-4800.
  - 2. Electriflex, Roselle, IL (800) 323-6174.
  - 3. Anixter, Inc., Skokie, IL (800) ANIXTER.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.



- B. Description: Interlocked steel and aluminum construction with PVC jacket.
- C. Fittings: NEMA FB 1.

## 2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Allied Tube & Conduit, Harvey, IL (800) 882-5543.
  - 2. Wheatland Tube Co., Collinswood, NJ (800) 257-8182.
  - 3. Republic Wire & Cable, Rocky Mount, NC (800) 533-8198.
  - 4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel set-screw type. Die-cut Zinc not permitted.

## 2.6 NONMETALLIC CONDUIT

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Carlon, Cleveland, OH (800) 322-7566.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Description: NEMA TC 2; Schedule 40 PVC.
- C. Fittings and Conduit Bodies: NEMA TC 3.

## 2.7 FITTINGS

- A. Manufacturer: Raco, Inc., South Bend, IN (219) 234-7151.
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Steel City.
    - b. O-Z/Gedney.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Conduits 1/2 inch thru 1 inch enter junction boxes, pull boxes, panels, cabinets, and gutters, provide the following:
  - 1. Rigid Conduit: Raco 1222, 1223, 1224.
  - 2. Flexible Metal Conduit: Raco 3302, 3303, 3304, 3305, 3306, 3308.
  - 3. Liquidtight Flexible Metal Conduit: Raco 3511, 3512, 3513, 3541, 3542, 3543.
- C. Conduits 1-1/4 inch and larger entering junction boxes, pull boxes, panels, cabinets, and gutters, provide Insulated throat type bushings; Raco 1225, 1226, 1228, 1230, 1232, 1234, 1236.
- D. Provide threaded joint connectors and malleable iron no thread compression box connectors on rigid conduit. Do not provide fittings requiring set screws or indenter type applications including BM connectors.
- E. Provide only steel set-screw couplings and connectors on EMT conduit.

## 2.8 CONDUIT STRAPS AND HANGERS

- A. Strap Manufacturer: Raco, Inc., South Bend, IN (219) 234-7151
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Steel City.
    - b. Unistrut.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Hanger Manufacturer: Steel City/Thomas & Betts, Memphis, TN (800) 888-0211.
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Unistrut.
    - b. Raco.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- C. Straps: Two-hole push on stamped steel straps on surface areas such as concrete, masonry, wide flange beams, columns, and wood.
  - 1. Rigid Conduit: Raco 2232, 2233, 2234, 2235, 2336, 2238.
  - 2. Electrical Metallic Tubing: Raco 2092, 2093, 2094.
- D. Hangers: Lay-in pipe hanger.
  - 1. Conduits 1-1/4 Inch and Larger: Steel-City C-149.
- E. Trapeze Hangers for Conduits Grouped Together: Hangers consisting of all thread rods sized as required and Kingdorff channel.
  - 1. Steel City B-909, 1/2 inch x 1-7/8 inch (12 gauge) with single bolt channel pipe straps.
  - 2. Steel City C-105, C-105-AL, or C-106, (no wire permitted for anchoring conduit).

## 2.9 SEAL-OFF AND EXPANSION FITTINGS

- A. Seal-Off Fitting Manufacturer: Crouse-Hinds, Syracuse, NY (315) 477-5531.
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Killark.
    - b. Appleton.
    - c. O-Z/Gedney.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Expansion Fitting Manufacturer: OZ/Gedney, Farmington, CT (860) 677-5541
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Crouse-Hinds.
    - b. Killark.
    - c. Appleton.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- C. Provide seal-off fittings where required by governing authority, code, or as indicated on Drawings.
  - 1. Vertical Runs: Crouse-Hinds Type EYS.
  - 2. Horizontal and Vertical Runs: Crouse-Hinds Type EZS.
  - 3. Elbows: Crouse-Hinds Type EYS.
  - 4. Sealing Compound: "Chico X" fiber and "Chico A".

- D. Provide expansion fittings in conduits where indicated on Drawings or where required to pass through expansion joints embedded in concrete.
  - 1. O-Z/Gedney Type AX.

## 2.10 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
  - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
  - 2. Receptacle and Device Boxes - 4 inch square x 2-1/8 inch deep with raised, single gang, plaster ring unless indicated otherwise.
  - 3. Switch Boxes: 2 inch x 4 inch x 2-1/8 inch deep, unless indicated otherwise.
  - 4. Communication Boxes: 4 inch square x 3 inch deep with raised gang plaster ring unless indicated otherwise.
- B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- C. Wall Plates for Finished Areas: Specified in Section 262726.

## 2.11 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

## 2.12 CABLE TRAY

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Chalfant Cable Trays, Cleveland, OH (216) 521-7922.
  - 2. Cable Management Solutions, Incorporated, Deer Park, NY (800) 308-6788.
  - 3. GS Metals Corporation, Pinckneyville, IL (800) 851-9341.
  - 4. Southwire Co., Carrollton, GA (800) 444-1700.
  - 5. Mono-Systems, Inc., Rye Brook, N.Y. (914) 934-2075.
  - 6. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Provide factory shop drawing submittals for each type of cable tray.
  - 1. Show fabrication and installation details of cable tray, including plans, elevations and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths and fittings.
  - 2. Seismic-Restraint Details: Signed and sealed by a qualified Professional Engineer, licensed in the state where Project is located, who is responsible for their preparation.
    - a. Design Calculations: Calculate requirements for selecting seismic restraints.
    - b. Detail fabrication, including anchorages and attachments to structure and to supported cable trays.
- C. Description: NEMA VE 1, ladder tray, wire mesh tray or solid bottom tray as indicated on drawings.
- D. Material: Steel or aluminum.
- E. NEMA Load/Span Class: 20C

- F. Finish: ASTM A 525, pre-galvanized or clear aluminum.
- G. Inside Width and Depth: Indicated on Drawings. Inside Radius of Fittings: 24 inches (minimum).
- H. Provide with compartment dividers as indicated on drawings. Same materials and finish as tray.
- I. Straight Section Rung Spacing: 9 inches on center (ladder tray only).
- J. Provide approved manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, connectors, and grounding straps. Obtain cable tray components from a single manufacturer.
- K. Engraved Nameplates: 1/2 inch high black letters on yellow laminated plastic nameplate, engraved with the following wording:

WARNING! DO NOT USE CABLE TRAY AS WALKWAY, LADDER, OR SUPPORT. USE ONLY AS MECHANICAL SUPPORT FOR CABLES AND TUBING!

## 2.13 FLOOR BOXES

- A. Type: Modular, flush-type dual-service units suitable for wiring method used. Provide dual-service units within carpeted areas only.
- B. Compartmentation: Barrier separates power and signal compartments.
- C. Housing Material: Die-cast aluminum, satin-finished.
- D. Power Receptacle: NEMA WD 6, Configuration 5-20R, ivory finish, unless otherwise indicated.
- E. Signal Outlet: Blank cover with brushed cable opening, unless otherwise indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Existing Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify routing and termination locations of proposed conduit prior to rough-in.
- C. Existing Utilities, Conduits and Piping:
  - 1. Locate the routings of the existing underground utilities, conduits and piping in the areas of the Work prior to the installation of the proposed conduit. Trace the locations of existing underground utilities, conduits, and piping using "Ground Penetrating Radar (GPR)" detection.
    - a. The routings of these existing underground utilities, conduits and piping shall be identified and marked to avoid any trenching conflicts. These routings shall be recorded on the As-Built drawings prepared by the Contractor for future reference.
  - 2. Existing utilities, conduits and piping that are to remain shall be supported and protected during the trenching process.
- D. Report in writing to the USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.

- E. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION - RACEWAYS

- A. Install in accordance with the following schedule, unless indicated otherwise on Drawings: Plastic flexible PVC conduit shall not be permitted. Flexible metal conduit shall be permitted for electrical power and security wiring only and not permitted for fire alarm cables.
  - 1. Above suspended ceilings: Galvanized or sherardised thick wall rigid steel (GRC) or electrical metallic tubing (EMT).
  - 2. Metal stud walls: Galvanized or sherardised thick wall rigid steel (GRC) or electrical metallic tubing (EMT).
  - 3. Exposed interior areas: Galvanized or sherardised thick wall rigid steel (GRC) or electrical metallic tubing (EMT).
  - 4. Exposed exterior areas: Galvanized or sherardised thick wall rigid steel (GRC).
  - 5. Underground or below slab areas: Rigid polyvinyl chloride conduit (PVC-Sched. 40).
- B. Install conduit in accordance with NECA "Standard of Installation."
- C. Install nonmetallic conduit in accordance with manufacturer's instructions. Nonmetallic conduit shall only be used under slabs or direct buried in earth. Conduit penetrations through slab including elbows shall be galvanized rigid conduit.
- D. Conduit routing indicated on Drawings are approximate locations unless dimensioned. Route parallel and perpendicular to building construction for complete wiring system regardless whether exposed or concealed.
- E. Arrange supports to prevent misalignment during wiring installation.
- F. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- G. Group related conduits; support using conduit rack. Construct rack using approved steel channel and provide space on each rack for 25 percent additional conduits.
- H. Fasten conduit supports to building structure and surfaces under provisions of this section.
- I. Do not support conduit with wire or perforated pipe straps in any type structure. Remove wire used for temporary supports. Steel tie wire may be used to anchor conduit down to reinforcing rods in concrete encasement only.
- J. Do not attach conduit or boxes to ceiling support wires. Boxes shall be independently supported.
- K. Arrange conduit to maintain headroom and present neat appearance. Maintain required clearance between conduit and piping.
- L. Route all conduit, whether exposed or concealed, parallel and perpendicular to walls, ceilings, building structures, etc.
- M. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- N. Cut EMT conduit square using saw or pipe cutter; de-burr cut ends and ream. Bring conduit to shoulder of fittings; fasten securely.

- O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- P. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes. Use Myers hub connectors on all conduit entering top or sides of all junction boxes, pull boxes, wiring gutters, exposed to weather.
- Q. The number of conduit bends per box shall comply with NFPA 70, Article 360. Conduit bends for "SCS" installation shall not exceed two 90 degree bends or exceed a total of 180 degrees of bend between pull boxes or conduit ends. Pull boxes shall be sized per NEC codes per conduit installed. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or use factory elbows for bends in metal conduit larger than 2 inch size.
- R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- S. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- T. Provide suitable nylon pull string or #14 AWG steel wire in each conduit excluding sleeves and nipples.
- U. Ground and bond conduit per NFPA 70.
- V. Coat all metallic conduit with "General Electric" RTV silicone sealer where conduit is installed in exterior areas or in contact with concrete or earth.
- W. Conduits shall be sized as indicated on Drawings. Where sizes are not indicated, conduit shall be sized per NFPA 70.
- X. Cap all upturned conduits during construction rough-in to prevent moisture or debris from entering. Pull through each and every conduit a dry swab of sufficient size to remove any and all moisture.
- Y. Maximum length of flexible metal conduit (Greenfield), or flexible liquid-tight shall be 5 feet.
- Z. Assure ground continuity on all branch circuitry conduits with two locknuts, one inside and one outside of all boxes, cabinets and gutters for rigid conduit. One locknut inside of all boxes, cabinets, and gutters for EMT.
- AA. Provide conduit supports as follows:
  1. Galvanized rigid thick wall conduit (GRC), intermediate grade rigid conduit (IMC) and electrical metallic conduit (EMT) within three feet of all outlet boxes, junction boxes, cabinets, gutters, or fittings. Horizontally anchored at 10 foot maximum intervals. Other spacings indicated on Drawings.
  2. Flexible metal conduit (Greenfield) and liquid-tight flexible metal conduit, within 12 inches of all outlet boxes, junction boxes, cabinets, gutters, or fittings and bends or turns. Horizontally anchored at 4-1/2 foot intervals. 1/2 inch minimum size permitted.

### 3.3 INSTALLATION - BOXES

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with NFPA 70.

- C. Set wall mounted boxes at elevations to accommodate mounting heights indicated or as required for specific project requirements. Orient boxes to accommodate wiring devices as specified in Section 262726.
- D. Electrical boxes are indicated on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose with no additional cost to contract. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- E. Maintain headroom and present neat mechanical appearance.
- F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Install pull boxes in freezer and dock area above bottom chord of structural joist. Pullboxes sized in excess of 12 inches shall be equipped with hinged and hasped covers.
- G. Install outlet and junction boxes within inaccessible ceiling areas, no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- H. Locate outlet boxes to allow luminaires positioned as indicated on Drawings.
- I. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- J. Locate flush mounted box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening. Use approved raised gang covers in masonry and stud walls.
- K. Flush mounted boxes shall not be mounted back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- L. Secure flush mounted box to interior wall and partition studs. Accurately position to allow for surface finish thickness. Use approved stamped steel bridges to fasten box between studs.
- M. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- N. Use approved adjustable steel channel fasteners spanning joist for hung ceiling outlet box.
- O. Provide factory sectioned multi-gang boxes where more than one adjacent device is to be mounted. Sectional boxes shall not be permitted.

#### 3.4 INSTALLATION - CABLE TRAYS

- A. Install trays level and plumb in accordance with manufacturer's published instructions.
- B. Install metallic cable tray in accordance with NEMA VE 2.
- C. Support cable trays as follows:
  - 1. Use anchors and fasteners as specified in Section 260500.
  - 2. Provide supports at each connection point and at the end of each run.
  - 3. Design supports including attachment to structure to carry the greater of calculated load multiplied by a factor of four or the calculated load plus 200 lb.
- D. Locate cable tray with sufficient space to permit access for installing cables.
- E. Make changes in directions and elevations using standard fittings. Use expansion connectors where required.

- F. Ground and bond cable tray under provisions of Section 260500.
- G. Provide continuity between tray components.
- H. Use antioxidant compound to prepare aluminum contact surfaces before assembly.
- I. Provide #2 AWG bare copper equipment grounding conductor through entire length of tray; bond to each section.
- J. Connections to tray may be made using mechanical connectors.
- K. Install warning signs at 50 feet on center along cable tray, located to be visible.

### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field inspection.
- B. Inspect conduit installation, types, sizes, fittings and attachment to structure.
- C. Inspect box installation, locations, connection to conduit, and attachment to structure.
- D. Inspect cable tray installation, locations, connection to conduit, and attachment to structure.

### 3.6 ADJUSTING

- A. Adjust flush-mounting outlets to make front flush with finished wall material.
- B. Install knockout closures in unused box openings.

### 3.7 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish like new.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022



## SECTION 260623

### LIGHTING CONTROL DEVICES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Lighting control system for Workroom.
  - 2. Control of Interior/Exterior Lighting.
  - 3. Control of Administrative Area Lighting.
  - 4. Occupancy Photo sensors.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the work of this section. Additional requirements and information necessary to complete the work of this section may be found in other documents.
- C. Related Sections:
  - 1. Section 019113 - General Commissioning Requirements.
  - 2. Section 260500 - Common Work Results for Electrical.
  - 3. Section 260800 - Commissioning of Electrical Systems.

##### 1.2 REFERENCES

- A. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA ICS 1 - General Standards for Industrial Control and Systems.
- B. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code.
  - 2. NFPA 101 - Life Safety Code
- C. Codes and Standards:
  - 1. International Building Code / National Electrical Code
  - 2. Occupational Safety and Health Agency Standards
  - 3. Illuminating Engineering Society Handbook
  - 4. ASHRAE Standard 90.1 – 2010.
  - 5. The International Energy Conservation Code.

##### 1.3 SUBMITTALS

- A. As specified in Section 260500 - Common Work Results for Electrical.
  - 1. Product Data: Data for each component specified indicating electrical characteristics and connection requirements.
    - a. Lighting Control Components.
    - b. Exterior Photo-Sensor.
    - c. Occupancy Sensors.
  - 2. Shop Drawings: Indicate electrical characteristics and connection requirements, including layout of completed assemblies, interconnecting cabling, dimensions, and power requirements.
  - 3. Assurance/Control Submittals:

- a. Certificates: Manufacturer's certificate that Products and components meet or exceed specified requirements.
  - b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.
- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- 1. Project Record Documents: Accurately record the actual locations of Products.
  - 2. Operating Instructions: Document training by furnishing a sign-in sheet with a description on the training provided, instructors name and organization and those who received training. Refer to 017704 1.3, 1.4 and 1.5 for more specific training.

#### 1.4 SYSTEM DESCRIPTION

- A. Each space enclosed by walls or floor-to-ceiling height partitions must be equipped with at least one automatic control device to independently control the general lighting within the space. This control device must automatically de-energize the space lighting within 30 minutes of all occupants leaving the space. Interior lighting for all spaces must utilize automatic occupancy sensors to turn off lighting in all spaces without occupant intervention.
- B. The workroom and enclosed platform lighting systems shall be provided to achieve the required light levels for the four lighting groups as shown on the drawings.
- 1. Task Light Group (TLG): The lights in this group provide 50 fc of Task lighting for 1) Equipment operator stations and/or 2) Areas within a zone that require a higher light level for visual acuity. The TLG lighting is provided by luminaires located in task-specific areas apart from the normal Ambient Light Group grid pattern.
  - 2. Ambient Light Group (ALG): This illumination group shall provide 25 fc for operational zones where work is performed that requires less visual acuity than that needed for Task lighting. This will be the primary lighting provided for workroom activities.
  - 3. Area of Travel Light Group (AOTLG): This illumination lighting group requires a minimum average of 12.5 fc for areas of travel such as aisles and walkways when all other lights are turned off. Maintain the minimum average of 12.5 fc's at all times. Luminaires within the "AOTLG" shall not be automatically controlled and shall be energized 24 hours/day
  - 4. Egress Lighting Group (ELG): This is a condition in which power to the facility or the lighting circuitry is interrupted. During these conditions, an average of 1 fc must be maintained along all emergency egress routes in accordance with the National Fire Protection Agency 101 Life Safety code. The column mounted, emergency battery units within the workroom must provide this emergency egress lighting.
- C. The functional characteristic of each luminaire within the workroom and enclosed platform shall be as follows:
- 1. All luminaires shall be automatically controlled by luminaire mounted occupancy sensors, unless otherwise indicated. The occupancy sensors must be appropriate for the luminaire mounting height within the workroom or platform.
  - 2. The occupancy sensors shall be luminaire mounted, passive infra-red type and must automatically turn the "TLG" and "ALG" lighting groups off within 20 minutes of the last detected presence within the Workroom.
- D. The lighting within exterior, open platform and canopies must be provided with bi-level control (0%, 50% to 100%). The lower output illumination level of 12.5 footcandles shall be automatically controlled by photo-sensor(s) and the higher output level of 25 footcandles must be both automatically and countdown timer controlled utilizing photo-cells with countdown timers fed downstream of the photo-sensor(s).
- E. Exterior lighting shall be energized by photo-sensor(s) and de-energized by time control functions.
- 1. The control of the exterior and building mounted signs shall operate similar to the exterior lighting control scheme, but shall utilize independent time schedules.

## 1.5 QUALITY ASSURANCE

- A. Single Source: Provide occupancy sensors, photocells, time switches, digital override timer switches, and other lighting control components from a single lighting control system supplier.
- B. Qualifications:
  - 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
  - 2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.
- C. Regulatory Requirements:
  - 1. Conform to requirements of NFPA 70 and NFPA 101.
  - 2. Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and indicated.
  - 3. Comply with NEC, NEMA and FCC Emission requirements for Class A applications.
  - 4. UL Approvals: Lighting control components are to be UL listed under UL 916 Energy Management Equipment.
- D. Testing:
  - 1. Component Pretesting: All component and assemblies are to be pretested and burned-in prior to installation.
  - 2. System Checkout: A factory trained technician shall test each component in the system after installation to verify proper operation. Submit check-out memo from factory representative.
  - 3. Functional testing of the lighting control system shall be provided by an independent commissioning authority in accordance with ASHRAE 90.1 - 2010. Refer to Section 260800 - Commissioning of Electrical Systems.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, Handle, Store, and protect products.
- B. Store products in clean, dry area; maintain temperature to NEMA ICS 1 requirements.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering products which may be incorporated in the work include the following:
  - 1. Cooper Controls, Peachtree City, GA (800) 553-3879.
  - 2. Encelium Technologies, inc., Philadelphia, PA (267) 286-0336.
  - 3. General Electric Company, Plainville, CT (800) 626-2000.
  - 4. Hubbell Building Automation, Inc, Austin, TX (888) 698-3242.
  - 5. Intermatic, Inc., Spring Grove, IL (815) 675-7000.
  - 6. Leviton, Little Neck, NY (800) 824-3005.
  - 7. Lighting Control & Design, Glendale, CA (800) 345-4448
  - 8. Lutron Electronics, Co. Coopersburg, PA (800) 523-9466.
  - 9. Novitas, Culver City, CA (310) 568-9600.
  - 10. Sensor Switch, Wallingford, CT (800) 727-7583.
  - 11. Tork, Mount Vernon, NY (914) 664-3542.
  - 12. Watt Stopper, Santa Clara, CA (800) 879-8585.

- B. Section 016000 - Product Requirements: Product options and substitutions. Unless otherwise indicated, substitutions are permitted.

## 2.2 EXTERIOR PHOTOCONTROL SENSOR

- A. Provide weatherproof line voltage photo-sensor for measuring exterior light levels: ON @ 1 to 5 fc / OFF @ 3 to 15 fc. The photo-sensor shall be mounted facing north as indicated on the plans. The photo-sensor shall be rated as follows: 1800 Watts @ 120VAC; 4150 Watts @ 277 VAC.
  - 1. Basis of Design:
    - a. Intermatic # K4141C (120/277 VAC)..
    - b. Tork/NSI #2001 (1800 Watts @ 120 VAC).
    - c. Tork/NSI #2002 (4620 Watts @ 277 VAC).

## 2.3 ANALOG, DUAL TECHNOLOGY, SINGLE RELAY, WALL BOX OCCUPANCY SENSOR

- A. Provide flush mounted, single relay, wall box type occupancy sensor with the following features:
  - 1. The Occupancy Sensor Switch shall be a designer-style, multiple-detection technology, universal voltage occupancy sensing wall switch.
  - 2. Sensor shall be designed to accept and control universal voltage (120VAC to 277VAC, 60Hz.) and rated to control up to 800-watt lighting loads @ 120VAC and 1200 Watts @ 277VAC..
  - 3. Sensor shall be a two-wire switch capable of handling the following loads:
    - a. Incandescent / Quartz Halogen
    - b. Solid-State LED
    - c. Electronic Low-Voltage
    - d. Magnetic Low-Voltage
    - e. Fluorescent Non-Dimming Ballasts
  - 4. Sensor shall have a viewing area of not less than 170 degrees at an axial distance of 40 feet, 50 feet at 0 degrees, and shall have a total coverage area of not less than 4,000 square feet with an unobstructed view.
  - 5. Sensor shall utilize non-intrusive, passive dual detection technologies consisting of:
    - a. Passive Infrared (PIR) to read and detect occupants' body heat and movement, and;
    - b. Enhanced microphonics to hear and detect occupancy throughout the entire space.
  - 6. Under no circumstances shall the unit emit energy of any type into the space that can potentially interfere with electrical, electronic, or medical devices (i.e. hearing aids), etc.
  - 7. Each unit shall provide manual on/automatic off operation and accept on/off commands from an unlimited number of multi-location 3-way Remotes.
  - 8. Remote stations shall provide multi-location On / Off control of the switch using conventional 3-way wiring.
  - 9. The unit shall, when manually turned off by the user, continue to monitor the space, but will not turn on the lights. User shall be able to, at anytime, override this feature by manually turning on the lights.
  - 10. The unit's operational/parameter programming shall be accomplished with the unit installed and operational without the need to remove the unit (or its faceplate) from its installed location.
  - 11. Each unit shall provide a LED indicator to provide indication when the sensor detects movement.
  - 12. Device shall mount in a single gang wallbox and be gangable with other designer-style electrical devices and faceplates.
  - 13. The Sensor shall be UL Listed to U.S. and Canadian standards for a 120VAC to 277VAC capacity.
  - 14. Basis of Design:
    - a. Sensor Switch #WSD-PDT Series.
    - b. WattStopper #FW-100 Series.

## 2.4 ANALOG DUAL TECHNOLOGY, DUAL RELAY, WALL BOX OCCUPANCY SENSOR

- A. Provide flush mounted, dual relay, wall box type occupancy sensor with the following features:
1. The occupancy sensor switch shall be a designer style, multiple detection technology, universal voltage, occupancy sensing wall switch.
  2. Sensor shall be capable of detecting presence in the control area by detecting Doppler shifts in transmitted ultrasound and passive infrared heat changes. Sensor shall utilize Dual Sensing Verification Principal for coordination between ultrasonic and PIR technologies. Each sensing technology shall have a LED indicator that remains active at all times in order to verify detection within the area to be controlled.
  3. Sensor shall feature a trigger mode where the end-user can choose which technology will activate the sensor. Selection of technologies for initial, maintain and re-trigger shall be done with DIP switches. Sensor shall have its trigger mode factory preset to allow for quick installation. In this default setting, both technologies must occur in order to initially activate lighting systems. Detection by either technology shall maintain lighting on, and detection by either technology shall turn lights back on after lights were turned off for 5 seconds or less in automatic mode and 30 seconds or less in manual mode.
  4. Sensor shall have 4 occupancy logic options for customized control to meet application needs.
  5. Ultrasonic sensing shall be volumetric in coverage with a frequency of 40 KHz. It shall utilize Advanced Signal Processing which automatically adjusts the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
  6. The PIR technology shall utilize a temperature compensated, dual element sensor and a multi-element Fresnel lens. The lens shall offer superior performance in the infrared wavelengths and filter short wavelength IR, such as those emitted by the sun and other visible light sources.
  7. Sensor shall utilize SmartSet technology to optimize automatic time delay to fit occupancy usage patterns. The use of SmartSet shall be selectable with a DIP switch.
  8. Sensor shall utilize Zero Crossing circuitry on both relays to reduce stress on relays and increase sensor life.
  9. Sensor shall utilize two relays capable of simultaneously controlling independent lighting loads or circuits. The secondary relay shall be isolated, allowing for two-circuit control.
  10. Sensor shall have no minimum load requirement and shall be capable of switching from 0 to 800 Watt solid-state LED; 0 to 800 Watt fluorescent or 1/6 hp at 120 VAC, 60 Hz; and 0 to 1200 Watt fluorescent at 277 VAC, 60 Hz.
  11. Sensor shall feature a walk-thru mode, where lights turn off 3 minutes after the area is initially occupied, if no motion is detected after the first 30 seconds, set by a DIP switch.
  12. Sensor shall cover up to 1,000 s.f. for walking motion with a field view of 180 degrees and shall have automatic-ON or manual-ON operation for both relays adjustable for each relay.
  13. The sensor shall act as a "service switch" to allow operation in the unlikely event of a failure and shall be able to control incandescent, magnetic low voltage, electronic low voltage, "LED" solid state, and fluorescent lighting loads
  14. Sensors shall have a built-in light level featuring simple, one-step daylighting setup that works from 8 to 180 footcandles.
  15. Wall switch sensor shall be a completely self contained control unit that replaces a standard toggle switch.
  16. To ensure quality and reliability, sensor shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%. Sensor shall have standard 5-year warranty and shall be UL and CUL listed.
  17. Basis of Design: Sensor Switch WattStopper #DW-200.

## 2.5 CEILING MOUNTED OCCUPANCY SENSOR

- A. Provide low voltage ceiling mounted, 360 degree, dual technology occupancy sensor with the following features.
1. The sensor shall be capable of detecting presence in the control area by detecting doppler shifts in transmitted ultrasound and passive infrared heat changes.
  2. Sensor shall utilize Dual Sensing Verification Principle for coordination between ultrasonic and PIR technologies. Detection verification of both technologies must occur in order to activate lighting systems. Upon verification, detection by either shall hold lighting on.

3. Sensor shall have a retrigger feature in which detection by either technology shall retrigger the lighting system on within 5 seconds of being switched off.
4. Ultrasonic sensing shall be volumetric in coverage with a frequency of 40 KHz. It shall utilize Advanced Signal Processing that automatically adjusts the detection threshold dynamically to compensate for changing levels of activity and airflow throughout controlled space.
5. The PIR technology shall utilize a temperature compensated, dual element sensor and a multi-element Fresnel lens. The lens shall be Poly IR4 material to offer superior performance in the infrared wavelengths and filter short wavelength IR, such as those emitted by the sun and other visible light sources. The lens shall have grooves facing in to avoid dust and residue build up which affects IR reception.
6. To avoid false ON activations and to provide immunity to RFI and EMI, Detection Signature Analysis shall be used to examine the frequency, duration, and amplitude of a signal, to respond only to those signals caused by human motion.
7. Sensors shall utilize SmartSet technology to optimize time delay and sensitivity settings to fit occupant usage patterns. The use of SmartSet shall be selectable with a DIP switch. Sensors shall have a time delay that is adjusted automatically (with the SmartSet setting) or shall have a fixed time delay of 5 to 30 minutes.
8. Sensors shall feature a walk-through mode, where lights turn off 3 minutes after the area is initially occupied if no motion is detected after the first 30 seconds.
9. Each sensing technology shall have an LED indicator that remains active at all times in order to verify detection within the area to be controlled. The LED can be disabled for applications that require less sensor visibility.
10. Sensor shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%. Sensors shall have standard 5 year warranty and shall be UL and CUL listed.
11. Basis of Design: Sensor Switch WattStopper[#DT-305]
12. Provide universal voltage, power pack for 24 VDC operating voltage to the occupancy sensors. Power pack shall enable manual on, hold on, hold off and load shed for bi-level switching applications. Basis of Design: Sensor Switch .

## 2.6 LUMINAIRE INTEGRATED OCCUPANCY SENSOR

- A. Provide line voltage, low profile, luminaire integrated occupancy sensor with the following features.
  1. Sensor shall be factory or field installed within each luminaire and shall utilize passive infra-red technology to detect presence.
  2. Sensor shall be line voltage rated 0-800 Watts @ 120VAC and 0-1200 Watts @ 277VAC for all solid-state LED and electronic fluorescent lighting loads.
  3. Sensor shall be rated for indoor/outdoor installation, shall be UL listed and shall have a standard five (5) year warranty.
  4. Sensor shall be available with different lens choices to provide flexibility for varying luminaire mounting heights of 8 ft. to 40 ft. AFF.
  5. Sensor shall have adjustable time delay from 30 seconds to 30 minutes; set to 20 minutes.
  6. Basis of Design:
    - a. WattStopper #FS-355.
    - b. Leviton #OSFHP Series.

## 2.7 DIGITAL WALL SWITCH OCCUPANCY SENSOR

- A. Provide wallbox mounted, dual technology, digital occupancy sensor with 1 or 2 switch buttons. Available in white, light almond, ivory, grey, red and black; compatible with decorator style, wall plates.
- B. Digital Occupancy Sensors shall provide scrolling LCD display for digital calibration and electronic documentation. Features include the following:
  1. Digital calibration and pushbutton programming for the following variables:
    - a. Sensitivity – 0-100% in 10% increments

- b. Time delay – 1-30 minutes in 1 minute increments
  - c. Test mode – Five second time delay
  - d. Detection technology – PIR, ultrasonic or dual technology activation and/or re-activation.
  - e. Walk-through mode
  - f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photo sensors are included in the local management network.
2. Two RJ-45 ports for connection to local management network.
  3. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool.
  4. Device Status LEDs to include:
    - a. PIR detection
    - b. Ultrasonic detection
    - c. Configuration mode
    - d. Load binding
  5. Assignment of occupancy sensor to a specific load within the room without the need for wiring or special tools.
  6. Assignment of local buttons to specific loads within the room without the need for wiring or special tools.
  7. Manual override of controlled loads.
- C. Low voltage momentary pushbuttons shall include the following features:
1. Load/Scene Status LED on each switch button with the following characteristics:
    - a. Bi-level LED
      - 1) Dim locator level indicates power to switch
      - 2) Bright status level indicates that load or scene is active
  2. The following button attributes may be changed or selected using a wireless configuration tool:
    - a. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
    - b. Individual button function may be configured to Toggle, On only or Off only.
    - c. Switch buttons may be bound to any load on a room controller and are not load type dependant; each button may be bound to multiple loads.
- D. Basis of Design: Sensor Switch, WattStopper LMDW-100 Series.

## 2.8 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR

- A. Provide ceiling mounted, dual technology, digital occupancy sensor. Furnish the manufacturer's system which accommodates the square-foot coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors and accessories which suit the lighting and electrical system parameters.
- B. Digital Occupancy Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features to include the following:
1. Digital calibration and pushbutton programming for the following variables:
    - a. Sensitivity – 0-100% in 10% increments
    - b. Time delay – 1-30 minutes in 1 minute increments
    - c. Test mode – Five second time delay
    - d. Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
    - e. Walk-through mode
    - f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photo sensors are included in the local management network.
  2. One or two RJ-45 port(s) for connection to local management network.
  3. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool.
  4. Device Status LEDs including:
    - a. PIR detection

- b. Ultrasonic detection
  - c. Configuration mode
  - d. Load binding
  - 5. Assignment of occupancy sensor to a specific load within the room without the need for wiring or special tools.
  - 6. Manual override of controlled loads.
- C. Basis of Design: Sensor Switch, WattStopper LMDC-100 Series.

## 2.9 DIGITAL WALL SWITCHES

- A. Provide low voltage, momentary, pushbutton switches in 1, 2, 3, 4, 5 and 8 button configuration; available in white, light almond, ivory, grey, red and black; compatible with decorator style, wall plates. Wall switches shall include the following features:
- 1. Two-way infrared (IR) transceiver for use with configuration remote controls.
  - 2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
  - 3. Configuration LED on each switch that blinks to indicate data transmission.
  - 4. Load/Scene Status LED on each switch button with the following characteristics:
    - a. Bi-level LED
      - 1) Dim locator level indicates power to switch
      - 2) Bright status level indicates that load or scene is active
  - 5. Two RJ-45 ports for connection to local management network.
- B. The following switch attributes may be changed or selected using a wireless configuration tool:
- 1. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
  - 2. Individual button function may be configured to Toggle, On only or Off only.
  - 3. Switch buttons may be bound to any load on a room controller and are not load type dependant; each button may be bound to multiple loads.
- C. Basis of Design: Sensor Switch, WattStopper LMSW-100 Series.

## 2.10 DIGITAL ON/OFF ROOM CONTROLLERS

- A. Room Controllers automatically bind the room loads to the connected devices in the space without the use of any tools. Room Controllers shall be provided to match the room lighting load and control requirements. The controllers shall be simple to install and will not be equipped with, dip switches, potentiometers or require special configuration. The control units shall include the following features:
- 1. Simple replacement – Using the default, automatic configuration capabilities, a room controller may be replaced with an off-the-shelf unit without requiring any configuration or setup.
  - 2. Device Status LEDs to indicate:
    - a. Data transmission
    - b. Device has power
    - c. Status for each load
    - d. Configuration status
  - 3. Quick installation features including:
    - a. Standard junction box mounting
    - b. Quick low voltage connections using standard RJ-45 patch cable
  - 4. Controller shall be plenum rated.
  - 5. Manual override and LED indication for each load
  - 6. Dual voltage (120/277 VAC, 60 Hz).
  - 7. Zero cross circuitry for each load.
- B. On/Off Room Controllers shall include:



1. One or two relay configuration
2. Efficient 150 mA switching power supply
3. Three RJ-45 local management network ports
4. Basis of Design: Sensor Switch, WattStopper LMRC-100 Series.

## 2.11 DIGITAL PHOTO SENSORS

- A. Digital photo sensors work with room controllers to provide automatic switching, bi-level, or tri-level daylight harvesting capabilities for any load type connected to a room controller. Closed loop photo sensors measure the ambient light in the space and control a single lighting zone. Open loop photo sensors measure incoming daylight in the space, and are capable of controlling up to three lighting zones. Photo sensors shall be interchangeable without the need for rewiring.
- B. Digital photo sensors shall include the following features:
1. An internal photodiode that measures only within the visible spectrum, and has a response curve that closely matches the photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrums. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.
  2. Sensor light level range shall be from 1-6,553 footcandles (fc).
  3. The capability of ON/OFF, bi-level or tri-level switching, for each controlled zone, depending on the selection of room controller(s) and load binding to room controller(s).
  4. For switching daylight harvesting, the photo sensor shall provide a field-selectable deadband, or a separation, between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling excessively after they turn off.
  5. Optional wall switch override to allow occupants to reduce lighting level to increase energy savings or, if permitted by system administrator, raise lighting levels for a selectable period of time or cycle of occupancy.
  6. Infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool.
  7. Configuration LED that blinks to indicate data transmission.
  8. Status LED indicates test mode, override mode and load binding.
  9. Recessed switch to turn controlled load(s) ON and OFF.
  10. One RJ-45 port for connection to local management network.
  11. Any load or group of loads in the room can be assigned to a daylighting zone
  12. Each load within a daylighting zone can be individually enabled or disabled for discrete control.
- C. Closed loop digital photo sensors shall include the following additional features:
1. An internal photodiode that measures light in a 100 degree angle, cutting off the unwanted light from bright sources outside of this cone.
  2. Automatic self-calibration, initiated from the photo sensor, a wireless configuration tool or a PC with appropriate software.
  3. Automatically establishes application-specific setpoints following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling.
  4. Basis of Design: WattStopper LMLS-400 Series.
- D. Open loop digital photo sensors include the following additional features:
1. An internal photodiode that measures light in a 60 degree angle cutting off the unwanted light from the interior of the room.
  2. Automatically establishes application-specific setpoints following manual calibration using a wireless configuration tool or a PC with appropriate software. For switching operation, an adequate deadband between the ON and OFF setpoints for each zone shall prevent the lights from cycling.
  3. Each of the three discrete daylight zones can include any non overlapping group of loads in the room.
  4. Basis of Design: Sensor Switch, WattStopper LMLS-500 Series.

## 2.12 ROOM NETWORK (LOCAL Management Network)

- A. The local management network is a free topology lighting control physical connection and communication protocol designed to control a small area of a building. Digital room devices connect to the network using CAT 5e cables with RJ-45 connectors which provide both data and power to room devices. Features of the management network include:
  - 1. Plug n' Go automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
  - 2. Simple replacement of any device in the network with a standard off the shelf unit without requiring commissioning, configuration or setup.
  - 3. Push n' Learn configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices in the local network.
  - 4. Two-way infrared communications for control configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.
- B. Basis of Design: Sensor Switch, WattStopper DLM System.

## 2.13 CONFIGURATIONS TOOL

- A. A configuration tool facilitates optional customization of local management networks, and is used to set up open loop daylighting sensors. The wireless configuration tool shall feature infrared communications.
- B. Features and functionality of the wireless configuration tool shall include:
  - 1. Two-way infrared (IR) communication with network enabled devices, within a range of approximately 30 feet.
  - 2. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.
  - 3. Read, modify and send parameters for occupancy sensors, daylighting sensors, room controllers and buttons on digital wall switches.
  - 4. Save up to nine occupancy sensor setting profiles, and apply profiles to selected sensors.
  - 5. Adjust or fine-tune daylighting settings established during auto-commissioning, and input light level data to complete commissioning of open loop daylighting controls.
- C. Basis of Design: Sensor Switch, WattStopper LMCT-100 Series.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. As specified in Section 260500 - Common Work Results for Electrical.

### 3.2 INSTALLATION

- A. The Lighting Control System shall be installed and wired completely as shown on the plans by the contractor, who shall make all necessary wiring connections to external devices and equipment.

### 3.3 FIELD QUALITY CONTROL

- A. As specified in Section 260500 - Common Work Results for Electrical.
- B. Perform operational testing on lighting control system to verify proper operation and field wiring connections.

- C. System Start Up and Commissioning
  - 1. Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all lighting control system components.
  - 2. Lighting control devices shall be tested to ensure that they are calibrated, adjusted, programmed, and in proper working condition in accordance with the construction documents and manufacturer's installation instructions.
    - a. Provide functional performance testing as required by Section 260800 – Commissioning of Electrical Systems.
  
- D. System Training
  - 1. Manufacturer shall provide factory authorized technician to train owner personnel in the operation, programming and maintenance of the lighting control system including all occupancy sensors and daylighting controls.
  
- E. System Programming
  - 1. Manufacturer shall provide system programming including:
    - a. Wiring documentation.
    - b. Switch operation.
    - c. Telephone overrides.
    - d. Operating schedules.

END OF SECTION

USPS R&A Specification Last Revised: 10/1/2022

## SECTION 262200

### SECONDARY DRY-TYPE TRANSFORMERS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Work Included: The work specified in this Section includes, but shall not be limited to, the following:
  - 1. Transformers shall be manufactured in compliance with D.O.E. 10 CFR 431.192, April 2013.
  - 2. Transformer shall be UL 1561 listed to feed a mix of equipment load profiles such as computers without derating or significant degradation of efficiency.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections:
  - 1. Section 260500 - Common Work Results for Electrical.

##### 1.2 REFERENCES

- A. As specified in Section 260500 – Common Work Results for Electrical.
- B. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
  - 1. IEEE 1100, "IEEE Recommended Practice for Powering and Grounding Electronic Equipment."
  - 2. ANSI/IEEE C57.1110, "Recommended Practice for Establishing Transformer Capability When Feeding Nonsinusoidal Load Currents."
- C. International Code Council (ICC):
  - 1. ICC ES AC156, "Acceptance Criteria for Seismic Qualification by Shake Table Testing of Nonstructural Components and Systems."
  - 2. ICC IBC, "International Building Code."
- D. International Organization for Standardization (ISO):
  - 1. ISO 9001, "Quality Management Systems Requirements."
  - 2. ISO 14001, "Environmental Management Systems Requirements with Guidance for Use."
- E. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)."
  - 2. NEMA ST 20, "Dry Type Transformers for General Applications."
  - 3. NEMA TP 1, "Standard for the Labeling of Distribution Transformer Efficiency."
  - 4. NEMA TP 2, "Standard Test Method for Measuring the Energy Consumption of Distribution Transformers."
- F. National Fire Protection Association (NFPA):
  - 1. NFPA 70, "National Electrical Code," hereinafter referred to as NEC.
  - 2. NFPA 5000, "Building Construction and Safety Code."
- G. Underwriters Laboratories, Inc. (UL):
  - 1. UL 1561, "Standard for Dry Type General Purpose and Power Transformers."
  - 2. UL 250, "Enclosure for Electrical Equipment".

- H. 2005 Energy Act PUBLIC LAW 109-58-AUG. 8, 2005. Comply with all Rules from Department of Energy:
  - 1. 10 CFR 429
  - 2. 10 CFR 431

### 1.3 SUBMITTALS

- A. As specified in Section 260500 – Common Work Results for Electrical.
- B. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.
  - 2. Manufacturer's Test Reports:
    - a. Copy of ISO 9001 Certification of manufacturing operation.
    - b. Copy of ISO 14001 Certification of manufacturing operation.
    - c. Confirmation that transformers are UL 1561 listed with a K1 rating. Those requiring a k factor rating will be K13 rated.
    - d. Construction details, including, but not limited to, enclosure dimensions, kVA rating, primary and secondary nominal voltages, voltage taps, approximate center of gravity, and unit weight.
    - e. Basic performance characteristics, including, but not limited to, insulation class, temperature rise, core and coil materials, impedances and audible noise level, unit weight, and inrush value expressed in a multiplier of rated primary current RMS.
    - f. Efficiency data shall be reported as described in the following sections. Reference temperatures shall be included when reporting efficiency.
      - 1) No load and full load losses shall be calculated per NEMA ST 20 test methods.
      - 2) Efficiency curves as follows:
        - i. Linear loads.
        - ii. Data per the non linear load test program.
    - g. Sound level ratings.
  - 3. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - b. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
- C. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals:
  - 1. Project Record Documents: Record actual locations of transformers.
  - 2. Maintenance Data: Include recommended maintenance procedures and intervals.

### 1.4 QUALITY ASSURANCE

- A. As specified in Section 260500 – Common Work Results for Electrical.
- B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.
  - 1. Seismic Requirements:
    - a. ICC IBC, NFPA 5000.
    - b. Tri axial shake table test results conducted in accordance with the ICC ES AC156 test protocol 3 (Acceptance Criteria for Seismic Qualification Testing of Nonstructural Components).

2. Comply with D.O.E. Guidelines established for manufacture, January 1, 2016 (10 CFR 431.192, April 2013).
- C. Compliance: Comply with applicable requirements of the following standards.
1. CSA 802.2.
  2. CSA C22.2.
  3. ASHRAE 90.1.
- D. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of 5 years.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
- B. Transformers shall be packaged for shipment using materials that shall have the least environmental impact.
1. Transformer Wrapping: Transformers shall be protected by cardboard protective material; all plastic wraps shall not be accepted.
  2. Transformer Shipping Base: Transformers shall be shipped on a base that uses at least 50 percent less wood than traditional pallets. Comply with ISPM No. 15.
- C. Store in a warm, dry location with uniform temperature. Cover ventilation openings to keep out dust, water, and other foreign material.
- D. Handle transformers using lifting eyes and/or brackets provided for that purpose. Protect against unfavorable external environment such as rain and snow, during handling.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
1. Eaton Corporation, Cutler-Hammer Products, Pittsburgh, PA (800) 525-2000.
  2. General Electric Company (800) 626-2000.
  3. Siemens Energy & Automation, Inc., Alpharetta, GA (800) 964-4114.
  4. Square D Company, Palatine, IL (800) 392-8781.
- B. Basis of Design: Product specified shall be D.O.E. 10 CFR 431.192, April 2013 compliant transformers ("EX" Series) as manufactured by Square D Schneider Electric. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect/Engineer will be the sole judge of the basis of what is equivalent.
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 TWO WINDING TRANSFORMERS

- A. The transformer shall be UL 1561 listed and labeled with a K1 rating (per UL 1561 35.2.1 and 34.2). Provide K13 rated transformers to serve mail processing equipment and other non-linear loads.
- B. Windings shall be continuous wound copper with brazed or welded terminations.

- C. Insulation and varnish systems shall be Nomex-based UL recognized 220 degrees C class utilizing an epoxy polyester impregnation.
- D. Maximum winding temperature rise for K1 rated units shall be 80 degrees C and K13 rated units shall be 130 degrees C rise.
- E. Terminals, including, but not limited to, those for changing taps, shall be readily accessible by removing a front coverplate.
- F. The transformers shall have a basic impulse level of 10 kV BIL.
- G. Voltage taps shall be as follows:
  - 1. Primary 480 volts.
    - a. For transformers 15 kVA to 300 kVA, provide two 2-1/2 percent full capacity taps above and four 2-1/2 percent below nominal primary voltage.
    - b. For transformers 500 kVA to 750 kVA, provide two 2-1/2 percent full capacity taps above and two 2-1/2 percent below nominal primary voltage.
- H. Impedance shall be the manufacturer's standard.
- I. Three phase transformer efficiency shall be as stated below (tested at 35 percent of the nameplate rating, per D.O.E. 10 CFR 431.192):
  - 1. 15 kVA: 98.26 percent.
  - 2. 30 kVA: 98.58 percent.
  - 3. 45 kVA: 98.69 percent.
  - 4. 75 kVA: 98.97 percent.
  - 5. 112.5 kVA: 99.03 percent.
  - 6. 150 kVA: 99.04 percent.
  - 7. 225 kVA: 99.12 percent.
  - 8. 300 kVA: 99.20 percent.
- J. Sound Levels shall be as follows:
  - 1. 15 and 30 kVA: 39 dB.
  - 2. 45 and 75 kVA: 44 dB.
  - 3. 112.5 kVA: 47 dB.
  - 4. 150 to 225 kVA: 49 dB.
  - 5. 300 kVA: 54 dB.
- K. Transformers shall be designed for continuous operation at rated kVA, for 24 hours a day, 365 days a year operation, with normal life expectancy as defined in ANSI C57.96.
- L. Where required for K13 rating, the neutral bus shall be configured to accommodate 200 percent of the rated current.
- M. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap in accordance with Article 250 of NFPA 70.
- N. Mounting: Suitable for wall, floor, or trapeze mounting, except transformers larger than 75 kVA, suitable for floor mounting.

## 2.3 ENCLOSURE

- A. The enclosure construction shall be ventilated, NEMA 2 drip-proof, with lifting holes. All ventilation openings shall be protected against falling dirt. On outdoor units, provide weather shields over ventilated openings.

- B. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

#### 2.4 SOURCE QUALITY CONTROL

- A. Production test each transformer according to NEMA ST20.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. As specified in Section 260500 – Common Work Results for Electrical.

#### 3.2 PREPARATION

- A. Provide minimum 3 inch high concrete pad for floor mounted transformers.

#### 3.3 INSTALLATION

- A. Install transformers in accordance with NECA SI and manufacturer's published instructions, at locations and as indicated on Drawings.
  - 1. Use manufacturer approved mounting brackets for transformers supported from building structure.
  - 2. Securely anchor transformers to concrete pad for floor mounted transformers.
  - 3. Provide working clearances in conformance with NFPA 70 and manufacturer's recommendations.
  - 4. Provide both primary and secondary protection using fuses or circuit breakers as indicated on Drawings.
- B. Set transformers plumb and level.
- C. Use minimum 2 foot length flexible conduit for connections to transformer case. Make conduit connections to side panel of enclosure.
- D. Mount transformers on vibration isolating pads suitable for isolating transformer noise from building structure.
- E. Provide grounding and bonding as specified in Section 260500.
- F. Furnish and install engraved plastic nameplates as specified in Section 260500.
- G. Furnish and install seismic restraints designed for type of mounting used.

#### 3.4 FIELD QUALITY CONTROL

- A. As specified in Section 260500 – Common Work Results for Electrical.
- B. Section 014000 - Quality Control: Field testing and inspection.
- C. Check for damage and tight connections prior to energizing transformer.



D. Measure primary and secondary voltages and make appropriate tap adjustments.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

## SECTION 262413

### SWITCHBOARDS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. The contractor shall provide and install service entrance and/or distribution switchboards as herein specified and shown on related electrical drawings.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections include the following:
  - 1. Section 019113 - General Commissioning Requirements.
  - 2. Section 260500 - Common Work Results for Electrical.
  - 3. Section 337173 - Electrical Utility Service.

##### 1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product data.
- B. Drawings: Submit shop drawings for approval. Include components, materials, finishes, detailed plan and elevation views, required conduit rough-in openings, anchors and accessories.

##### 1.3 RELATED STANDARDS

- A. The switchboard shall be designed, manufactured, and tested according to the latest applicable version of the following standards:
  - 1. ANSI/NFPA 70 – National Electrical Code (NEC)
  - 2. NEMA PB2 – Deadfront Distribution Switchboards
  - 3. UL 891 – Deadfront Switchboards

##### 1.4 QUALITY ASSURANCE

- A. Manufacturer: For equipment required for the work of this section, provide product which is the responsibility of one manufacturer.
- B. Performance Requirements: Provide switchboards manufactured in accordance with Article 408 of the latest National Electrical Code and applicable portions of the NEMA PB2, UL 891 and NFPA 70, the National Electrical Code.

##### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures, and construction operations.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Eaton Corporation, Cutler-Hammer Products, Pittsburg, PA (800) 525-2000.
  - 2. General Electric Company (800) 626-2000.
  - 3. Siemens Energy and Automation, Alpharetta, GA (800) 964-4114.
  - 4. Square D Company, Palatine, IL (800) 392-8781.
  - 5. No substitutions permitted.
- B. For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum of 10 years.

### 2.2 GENERAL REQUIREMENTS

- A. Construction
  - 1. Switchboard shall be of the modular type construction, constructed in accordance with the latest NEMA PB-2 and UL 891 standards, with the required number of vertical sections bolted together to form one metal enclosed rigid switchboard. The sides, top and rear shall be covered with removable screw-on code gauge steel plates. Switchboard shall include all protective devices and equipment as listed on drawings with necessary interconnections, instrumentation, and control wiring. All groups of control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips. Service entrance switchboards shall be suitable only for use as service equipment and be labeled in accordance with UL requirements. System voltage, amperage and interrupting capacity shall be as indicated on the drawings. Enclosure construction shall be NEMA 1 indoor.
- B. Bus Requirements
  - 1. The bus shall be of sufficient size to limit the temperature rise to 65 degree C, based on UL tests. The bus shall be braced and supported to withstand mechanical forces exerted during a short circuit from a power source having the available short circuit current as indicated on the drawings. Provide a full capacity neutral where a neutral is indicated on the drawings. The through bus on the end section shall be extended and pre-drilled to allow the addition of future sections. Ground bus and grounding conductor lug shall be furnished. Ground bus shall extend the entire length of the switchboard and shall be firmly secured to each vertical section. Bus Material shall be silver-plated copper.
- C. Incoming Service
  - 1. Underground Service: To isolate incoming underground service conductors, an underground cable pull or auxiliary section shall be used. This section shall be of the bussed type and shall be sealable per local utility requirements, when required.
  - 2. Service Section: The service section shall be designed for the system parameters indicated and shall have user metering and main protective device as indicated.
  - 3. Screw-type mechanical lugs to terminate copper cable shall be provided as detailed on the drawings.
- D. Fire Pump Tap
  - 1. The fire pump tap section shall be on the line side of the main disconnect(s) and contain only through bus and tap lugs to feed the fire pump.
- E. Main Protective Device

1. Service entrance style switchboards shall be double-ended type equipped with draw-out, low voltage, power circuit breakers for the “mains and tie” breakers and molded case feeder circuit breakers. Low voltage power circuit breakers shall be provided with a drawout frame and current rating as shown on the drawings. It shall be electrically operated power circuit breaker with a solid-state trip device providing adjustments for long time pick up and delay, short time pickup and delay, instantaneous, ground fault pickup and delay, and zone selective interlocking for short time and ground fault.
  - a. Insulated case, draw-out circuit breakers shall comply with the requirements of UL489 and UL1066. Breakers shall be three-pole, 100% rated type:
    - 1) Circuit breaker element shall have connected, test and disconnected position indicators, spring charged/discharged indicators and circuit breaker open or closed and ready to close indicators all of which shall be visible to the operator with the compartment door closed. It shall be possible to rack the circuit breaker element from the connected to the disconnected position with the compartment door closed, otherwise known as “through the door drawout”.
    - 2) Provide interlocks to prevent racking the circuit breaker unless the breaker is open.
    - 3) Ratings: Interrupting up to 100 kA at 480V without fuses. Short time current ratings for each circuit breaker shall be as indicated on the drawings or data tables. Circuit breakers shall be 600-volt class.
    - 4) Operating Mechanism: Mechanically and electrically trip-free, stored-energy operating mechanism with the following features:
      - i. Normal Closing Speed: independent of both control and operator
      - ii. Electrical operator, field installable with manual charging
      - iii. Operations counter
    - 5) Each low voltage circuit breaker shall be equipped with self-powered, microprocessor-based trip-device to sense overload and short circuit conditions. The device shall measure true RMS current. The tripping system shall consist of high accuracy (<1%) Rogowski coil sensors on each phase, a release mechanism and the following features:
      - i. Field Installable and interchangeable front mounted trip units. Trip units can be upgraded for future expansion in functionality, such as communication.
      - ii. Functions: Long time, short time and extended instantaneous protection function shall be provided (EIP) to allow the breaker to be applied at the withstand rating of the breaker with minus 0% tolerance so that there is no instantaneous override whatsoever. This feature shall furthermore allow the circuit breaker to be applied up to the full instantaneous rating of the breaker on systems where the available fault current exceeds the breakers withstand rating. Each shall have an adjustable pick-up setting. In addition, long time and short time bands shall each have adjustable time delay. Short time function shall include a switchable I2t ramp and optionally I4t to improve co-ordination with fuses or inverse relays.
      - iii. A software program shall be made available free of charge to support system co-ordination studies. The software will allow time current curves to be generated for the chosen settings.
      - iv. Individual LED’s shall indicate an overcurrent, short circuit or ground fault trip condition.
      - v. Time-current characteristics shall be field adjustable locally or optionally remotely via a bus system ModBus.
      - vi. Current Adjustability shall be accomplished by use of dial setting and rating plugs on trip units. The rating plug shall be front mounted and upgradeable. Upgrades to the rating plugs shall not require changes to the CT.
      - vii. Pickup Points: 10 Long Time Settings.
      - viii. Field Installable Ground-fault protection with at least three time-delay bands and an adjustable current pickup and an I2t ramp. Arrange to provide protection for three-wire service.

- ix. Field installable zone selective interlocking: Connections will be made between main, tie and feeder circuit breakers to ensure that the circuit breaker closest to the fault trips for short time and ground fault conditions.
  - x. A LCD display shall be available to simplify settings & viewing data locally.
  - xi. Field installable configurable analog and digital output relays shall be available to connect directly to the trip unit.
  - xii. Waveform capture and display shall be accomplished on the trip units LCD display.
  - xiii. A visible pin shall indicate wear. In addition to the visible pin indicator, estimated contact wear shall be calculated in the trip unit.
  - xiv. Terminal Block Connections shall be front mounted and utilize screw type terminals.
  - xv. Padlocking Provisions shall be included to install at least three padlocks on each circuit breaker to prevent movement of the drawout mechanism.
  - xvi. Operating Handle shall be an integral part of the breaker. No external tools shall be required to rack the breaker.
  - xvii. Control Switch: One for each electrically operated circuit breaker.
  - xviii. Key Interlocks: Main and tie-breakers.
  - xix. Undervoltage Trip: Adjustable time-delay.
  - xx. Shunt-Trip – field installable.
  - xxi. Modular communication and relaying accessories are to be available for retrofitting by the clients chosen engineer. It shall not be necessary for the manufacturer's personnel to retrofit accessories.
  - xxii. Accessories shall be front mounted. Modular communications and relaying accessories are to be available for retrofitting by the clients chosen engineer. It shall not be necessary for the manufacturer's personnel to retrofit accessories.
  - xxiii. Portable lifting yoke for drawout circuit breakers.
  - xxiv. Field interchangeable accessories shall include CT's, trip units, racking mechanism and all internal & external accessories.
- b. Feeder circuit breakers shall be molded case, quick-make, quick-break, trip-free, thermal magnetic, solid state type. The continuous current rating shall be adjustable from 20 to 100% without the need for a rating plug. Solid state breaker trip functions shall include adjustments for continuous amperage, long time pickup and delay, instantaneous short time pickup and delay and ground fault pickup and delay, if required. Breaker ratings shall be as shown on the drawings.
2. Main circuit breakers within switchboards downstream of the incoming service shall be molded case quick-make, quick-break, trip-free, thermal magnetic, solid state type. The continuous current rating shall be adjustable from 20 to 100% without the need for a rating plug. Solid state breaker trip functions shall include adjustments for continuous amperage, long time pickup and delay, instantaneous short time pickup and delay, ground fault pickup and delay and zone selective interlocking for short time and ground fault. Breaker ratings shall be as shown on the drawings.
- a. Distribution section branch protective devices shall be molded case circuit breakers.
    - 1) Molded Case Circuit Breakers (MCCB's) shall be of quick-make, quick-break, trip-free, thermal magnetic, solid-state – 150 amp frame, 30 amp trip and above type with frame, trip and voltage ratings, as indicated on the drawings. The switchboard shall have space or fully equipped provisions for future units as shown on the drawings.
- F. Distribution Sections
- 1. Individual sections shall be front accessible, not less than 20" deep and the rear of all sections shall align. Incoming line termination, main device connection and all bolts used to join current-carrying parts shall be installed so as to permit servicing from the front only so that no rear access is required. The branch devices shall be front removable and panel mounted with line and load side connections front accessible. The interior shall be capable of accepting panel mounted molded case circuit breakers.

- G. Ground Fault Protection
  - 1. Furnish and install, in the service equipment switchboard, ground fault protection and indication equipment as shown on drawings in accordance with NEC 230-95. All parts of the systems specified shall be UL Listed. All ground fault protection and indication equipment shall be factory installed, wired and tested by the switchboard manufacturer.
- H. Finish
  - 1. The complete switchboard shall be phosphatized and finished with ANSI 61 light gray polyester powder paint.
- I. Markings
  - 1. Each switchboard section shall have a label permanently affixed to it, listing the following information: Name of manufacturer, system voltage, ampacity, type, manufacturer's shop order number and date.
  - 2. Each section of switchboard shall bear a UL listing mark, where qualified and a short circuit rating label.
  - 3. Front, side, rear and top of each switchboard section will have a DANGER label in accordance with NEMA Standard PB-2.
- J. Transient-Voltage Suppression
  - 1. Provide Transient-Voltage Suppression per specification Section 264128.
- K. ARC FLASH
  - 1. Apply in the field, the factory supplied arc flash warning labels to all switchboards to warn qualified persons of potential electrical arc flash hazards.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Examine substrates and conditions in which units will be installed. Check for clearance that will be required before, during and after equipment installation. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Strictly comply with manufacturer's instructions and recommendations and NEMA PB 2.1. Coordinate installation with adjacent work to ensure proper sequence of construction, clearances, and support.
- C. Install units plumb, level and rigid without distortion to the switchboard cubicle(s).

### 3.2 ADJUSTMENTS AND CLEANING

- A. Clean exposed surfaces using manufacturer recommended materials and methods.
- B. Touch-up damaged coatings and finishes using non-abrasive materials and methods recommended by manufacturer. Eliminate all visible evidence of repair.

### 3.3 TESTING

- A. Perform factory and installation tests in accordance with applicable NEC, NEMA and UL requirements.

3.4 WARRANTY

- A. Equipment manufacturer warrants that all goods supplied are free of non-conformities in workmanship and materials for 18 months from date of initial operation.

END OF SECTION

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## SECTION 262416

### PANELBOARDS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This section includes:
  - 1. Panelboards.
- B. Related Documents: The contract documents as defined in Section 011000 – Summary of Work, apply to the work of this section. Additional requirements and information necessary to complete the work of this section may be found in other documents.
- C. Related Sections:
  - 1. Section 260500 – Common Work Results for Electrical.

##### 1.2 REFERENCES

- A. As specified in Section 260500 - Common Work Results for Electrical.
- B. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA AB 1 – Molded Case Circuit Breakers.
  - 2. NEMA ICS 2 – Industrial Control Devices, Controllers, and Assemblies.
  - 3. NEMA KS 1 – Enclosed Switches.
  - 4. NEMA PB 1 – Panelboards.
  - 5. NEMA PB 1.1 – Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- C. Underwriters Laboratories (UL):
  - 1. UL 486 – Molded Case Circuit Breakers.
  - 2. UL 67 – Heat Rise Test for Panelboards.
  - 3. UL 50 – Steel Gauge Requirements for Cabinets and Enclosures.
  - 4. UL 1449 4<sup>th</sup> Edition – Standard for Transient Voltage Surge Suppressors.

##### 1.3 SUBMITTALS

- A. As specified in Section 260500 – Common Work Results for Electrical.
  - 1. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
  - 2. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
  - 3. Shall include UL 1449 Listing documentation verifying the following:
    - a. Short Circuit Current Rating (SCCR).
    - b. Voltage Protection Ratings (VPRs) for all modes.
    - c. Maximum Continuous Operating Voltage Rating (MCOV).
    - d. I-nominal rating (I-n).
- B. Section 017704 – Closeout Procedures and Training: Procedures for closeout submittals:



1. Project Record Documents: Record actual locations of Products; indicate actual branch circuit arrangement.
2. Operation and Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.
3. Submit data showing compliance with UL 1449.

#### 1.4 QUALITY ASSURANCE

- A. As specified in Section 260500 - Common Work Results for Electrical
- B. Panelboards shall be UL Listed and labeled and shall be designed in accordance with the applicable standards of ANSI and NEMA.
- C. Qualifications
  1. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

### PART 2 - PRODUCTS

#### 2.1 GENERAL CLASSIFICATION

- A. Manufacturers: ABB/G.E. Industrial Solutions (ABB/GEIS) Catalog numbers are used to identify type of equipment specified. Equivalent products by the following manufacturers are acceptable:
  1. Siemens
  2. Square-D
  3. Eaton/Cutler Hammer
    - a. Branch Circuit Panels:
      - 1) 120/208V: ABB/GEIS Type ReliaGear.
    - b. Distribution Panels:
      - 1) Circuit breaker: ABB/GEIS Type ReliaGear nexT.
  4. No substitutions permitted.

#### 2.2 BRANCH CIRCUIT PANELS

- A. Cabinet: Construct cabinet with code gauge galvanized steel. Provide minimum 20 inch wide cabinets, and extra wiring space where incoming feed-through or parallel lines are required.
- B. Doors: Provide single door construction, made of cold-rolled steel. Door shall have concealed hinges, flush catch, and lock. (Tee bar handles not acceptable). Secure top and bottom of door to cabinet by slotted steel bolts. Release shall be by one-half turn with a screwdriver. All panels shall be keyed alike.
  1. Panelboards shall be equipped with "door within door" type trim.
- C. Panels located adjacent to each other shall have identically sized enclosures and trims.
- D. Finish: Finish exposed parts with one coat of primer and one coat of light gray enamel suitable for overpainting in field if desired.
- E. Phase, neutral and ground bus bars shall be tin plated copper.
- F. Provide all hardware for future breakers, identified on drawings as SPACES, or for the full length of usable bus, whichever is longer.
- G. Provide ground bus with full complement of terminals in addition to insulated neutral bus.

- H. Circuit Breakers:
  1. Provide multi-pole units with common trip elements. Handle ties are not acceptable.
  2. Provide circuit breakers equipped with padlockable handle attachments, padlocks and keys for padlocking the breaker in the "on" position when used to serve Fire Alarm, Security and CCTV Systems. Handle padlock attachment shall be similar to Square D types #QOHPL or #QO1PA with padlock and keys or Garvin Industries #UBL2-UPC. Key operated, circuit breaker attachments utilizing a screwdriver or allen wrench shall not be acceptable.
  3. 120/208V branch circuit panelboards: Molded cast bolt-on type designed for 120/208V, three phase, four wire service with minimum 10,000 amperes rms short circuit rating.
  4. 277/480V branch circuit panelboards: Molded cast bolt-on type designed for 277/480V, three phase, four wire service with minimum 14,000 amperes rms short circuit rating.
- I. Main circuit breakers shall be individually mounted. The panelboard interior assembly shall be dead front with panelboard front removed. Main lugs or main breakers shall have barriers on five sides. The barrier in front of the main lugs shall be hinged to a fixed part of the interior. The end of the bus structure opposite the main shall have barriers.
- J. Provide all panelboards with lockout/tagout devices; Circuit-Safe type as manufactured by Stranco, Inc. or approved equal.
- K. Nameplates: Provide engraved plastic nameplate identification on outside of each panel to include the voltage and source of power upstream, as specified in section 260500.
- L. Circuit directories: Provide a metal-framed circuit directory on inside of inner door, with plastic protector.
- M. Provide two 3/4 inch and one 1 inch spare empty conduits routed above into accessible ceiling space from all flush mounted panelboards.
- N. Panels serving electronic equipment and/or other harmonic producing loads shall be equipped with double neutral bus bars.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. As specified in Section 260500 – Common Work Results for Electrical.

### 3.2 CLEARANCES

- A. Minimum code required clearances around panelboards must be maintained.

### 3.3 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1.
- B. Install panelboards plumb. Provide supports in accordance with Section 260500.
- C. Provide filler plates for unused spaces in panelboards.

### 3.4 MOUNTING HEIGHT

- A. Typically mount panel boards top at 6 feet above finished floor but no more than 6 feet 6 inches above finished floor to top of circuit breaker handle.

### 3.5 MOUNTING HARDWARE

- A. Provide all necessary blocking, channels and other hardware for securing panelboards to wall, column, or other parts of building structure.

### 3.6 FIELD CONTROL

- A. Section 014000 – Quality Requirements: Field Testing and Inspection.
- B. Perform inspections and tests listed in NETA ATS, Section 7.6.
- C. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.
- D. Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

END OF SECTION

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## SECTION 262726

### WIRING DEVICES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Wall switches.
  - 2. Receptacles.
  - 3. Device plates and box covers.
  - 4. Multi-Outlet surface raceway.
  - 5. TelePower Poles.
  - 6. Digital Interval Countdown Timer Switch
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 260500 - Common Work Results for Electrical.

##### 1.2 REFERENCES

- A. National Electrical Contractors Association (NECA):
  - 1. NECA "Standard of Installation."
- B. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA WD 1 – General Requirements for Wiring Devices.
  - 2. NEMA WD 6 – Wiring Devices – Dimensional Requirements.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code.

##### 1.3 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 5 years documented experience.
- B. Regulatory Requirements:
  - 1. Conform to requirements of NFPA 70.
  - 2. Provide Products listed and classified by Underwriters Laboratories, Incorporated.

##### 1.4 SUBMITTALS

- A. Product data required.

## PART 2 - PRODUCTS

### 2.1 WALL SWITCHES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Hubbell, Inc, Milford, CT (203) 882-4800.
  - 2. Leviton Manufacturing, Company, Inc., Little Neck, NY (800) 824-3005.
  - 3. Pass & Seymour, Syracuse, NY (800) 776-4035.
- B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- C. Provide 20Amp, 120/277Volt, specification grade, flush single pole toggle switches with side and back wired screw terminals. All switches shall be equipped with grounding screws.
- D. Single Pole Switch:
  - 1. Leviton Cat. No.1221-2.
  - 2. P&S Cat. No. PS20AC1l.
  - 3. Hubbell Cat. No. HBL1221.
- E. Double Pole Switch:
  - 1. Leviton Cat. No. 1222-2.
  - 2. P&S Cat. No. PS20AC2.
  - 3. Hubbell, Cat. No. HBL1222.
- F. Three-way Switch:
  - 1. Leviton, Cat. No. 1223-2.
  - 2. P&S Cat. No. PS20AC-3.
  - 3. Hubbell Cat. No. HBL1223.
- G. Indicator Switch:
  - 1. Leviton Cat. No. 1221-PLR (Red).
  - 2. P&S Cat. No. PS20AC1-RPL (Red).
  - 3. Hubbell Cat. No. HBL1221PL (Red).
- H. Locator Switch:
  - 1. Leviton Cat. No. 1221-LHC (Clear).
  - 2. P&S Cat. No. PS20AC1-CSL (Clear).
  - 3. Hubbell Cat. No. HBL1221IL (Clear).
- I. Locking Switch:
  - 1. Leviton Cat. No. 1221-2L.
  - 2. P&S Cat. No. PS20AC1-L.
  - 3. Hubbell Cat. No. HBL1221L.
- J. Color: Switches located within the Retail Area to be mounted in "blue" or "red" painted walls shall be black. All other switches shall be white unless indicated otherwise.

### 2.2 RECEPTACLES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Leviton Manufacturing, Company, Inc., Little Neck, NY (800) 824-3005.
  - 2. Pass & Seymour, Syracuse, NY (800) 776-4035.
  - 3. Hubbell, Inc, Milford, CT (203) 882-4800.

4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Provide duplex, specification grade, 20Amp, 125Volt, 2 pole, 3 wire receptacles with grounding screw.
  - C. Duplex Convenience Receptacle:
    1. Leviton Cat. No. 5362.
    2. P&S Cat. No. 5362.
    3. Hubbell Cat. No. HBL5352.
  - D. Tamper and Weather Resistant GFCI Receptacle (Side Wired Feed-Thru):
    1. Hubbell Cat. No. GFR5362SG.
  - E. Color: Receptacles located within the Retail Area to be mounted in "blue" or "red" painted walls shall be black. All other receptacles shall be white unless indicated otherwise.

### 2.3 WALL PLATES

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  1. P&S Sierra.
  2. Hubbell.
  3. Leviton.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Coverplate: Coverplates to be installed within the Retail Areas on "blue" or "red" painted walls shall be black smooth thermoplastic. All other coverplates shall be white smooth thermoplastic unless otherwise noted.
  1. Sierra TP8-W.
- C. Weatherproof Coverplate: Gasketed cast metal with hinged gasketed device.
  1. Sierra 4510 cast aluminum.
- D. Integral locking and pad-lockable coverplates:
  1. Duplex receptacles shall be equipped with Decora style, stainless steel, single gang, locking coverplates: Pass & Seymour/Legrand #WR26L.
  2. Quadraplex receptacles shall be equipped die-cast metal, low profile, two gang, flip type, pad-lockable coverplates: Hubbell/TayMac #MX2050S.
    - a. Provide two (2) keyed, padlocks for each quadraplex coverplate: Master Lock #4120KA.
    - b. All quadraplex receptacles to be keyed alike.

### 2.4 MULTI-OUTLET SURFACE RACEWAY

- A. Manufacturer: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  1. Legrand/Wiremold, West Hartford, CT (800) 621-0049.
  2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Raceway Material: Anodized aluminum with manufacturer's standard hardware and fittings. Length as indicated on drawings.
- C. Wire: Factory pre-wired with No. 12 AWG minimum. Provide equipment grounding conductor.

- D. Wiring Devices: NEMA5-20R duplex receptacles and/or telecommunication outlets. Quantity as indicated on drawings.
- E. Provide single channel raceway for applications requiring power receptacles only. Provide dual channel raceway for applications requiring power receptacles and telecommunications outlets.
- F. Single channel, single cover raceway.
  - 1. Wiremold #AL3000 Series.
- G. Dual channel, single cover raceway
  - 1. Wiremold #AL4000 Series.

## 2.5 TELE/POWER POLE

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  - 1. Legrand/Wiremold, West Hartford, CT (800) 621-0049.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Raceway Material: Anodized aluminum with manufacturer's standard hardware and fittings. Length as indicated on drawings.
- C. Wire: Factory pre-wired with No. 12 AWG minimum. Provide equipment grounding conductor.
- D. Wiring Devices: NEMA5-20R duplex receptacles and/or telecommunication outlets. Quantity as indicated on drawings.
- E. Basis of Design: Wiremold NP620 Series.

## 2.6 DIGITAL INTERVAL COUNTDOWN TIMER SWITCH

- A. Provide flush wall mounted line voltage, digital, countdown timer switch with the following features:
  - 1. The timer switch shall be preset to turn loads "off" after a preset interval time of 60 minutes maximum. Switch shall be equipped with manual on/off pushbutton.
  - 2. Timer switch shall mount in a standard single gang wall box and shall fit behind a decorator style face plate. The control switches shall not protrude more than 1/8 inch from the wall.
  - 3. Timer switch shall have no minimum load requirement from 0 to 800 Watt @ 120 VAC - 60 Hz.
  - 4. Optional flash and beep warnings shall notify occupants when the interval countdown reaches one minute.
  - 5. The switch shall not require a neutral, simplifying installation and shall feature terminal style wiring, which makes installation easier.
  - 6. Basis of Design:
    - a. Sensor Switch #PTS-60 (60 minute max.)
    - b. Intermatic #EI215 (1800W @ 120 VAC).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.

- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify that outlet boxes are installed at proper height.
  - 2. Verify that wall openings are neatly cut and will be completely covered by wall plates.
  - 3. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

### 3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

### 3.3 INSTALLATION

- A. Install wiring devices as indicated, in accordance with manufacturer's written instruction, applicable requirements of the NEC and NECA "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install receptacles with grounding pole on bottom.
- E. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
- F. Connect wiring devices by wrapping conductor 2/3 of screw diameter in clockwise direction around screw terminal. Tighten screw to 12 pound-inches. Do not use spring pressure devices for wire connections.
- G. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- H. Provide coverplates on switch, receptacle, and blank outlets.
- I. Receptacles mounted within 8 feet of a fire extinguisher shall be equipped with integral locking or pad-lockable coverplates as specified in paragraph 2.3 D.

### 3.4 LABELING

- A. All coverplates for receptacles and switches shall be labeled with the branch circuit number. Label shall be machine generated and permanently affixed to the outside of the coverplate.

### 3.5 CONSTRUCTION

- A. Interface with other work:
  - 1. Coordinate locations of outlet boxes provided under Section 260533 to obtain mounting heights indicated on Drawings.

### 3.6 FIELD QUALITY CONTROL



- A. Section 014000 - Quality Requirements: Field inspection.
- B. Prior to energizing circuitry, test wiring for electrical continuity, and for short circuits. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements.
- C. Inspect each wiring device for defects.
- D. Operate each wall switch with circuit energized and verify proper operation.
- E. Verify that each receptacle device is energized.
- F. Test each receptacle device for proper polarity.
- G. Test each GFCI receptacle device for proper operation.

### 3.7 ADJUSTING

- A. Adjust devices and wall plates to be flush, level and plumb with wall.

### 3.8 CLEANING

- A. Section 017300 - Execution: Cleaning installed work.
- B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

## SECTION 262816

### ENCLOSED SWITCHES AND CIRCUIT BREAKERS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Fusible switches.
  - 2. Nonfusible switches.
  - 3. Fuses.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- C. Related Sections:
  - 1. Section 260500 - Common Work Results for Electrical: Basic electrical methods.

##### 1.2 REFERENCES

- A. National Electrical Testing Association (NETA):
  - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Electrical Contractors Association (NECA):
  - 1. NECA SI - Standard of Installation.
- C. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA FU 1 - Low Voltage Cartridge Fuses.
  - 2. NEMA KS 1 - Enclosed Switches.
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data:
    - a. Switch ratings and enclosure dimensions.
    - b. Fuse data sheets showing electrical characteristics including time-current curves.
  - 2. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - b. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
  - 1. Project Record Documents: Record actual locations of enclosed switches and actual fuse sizes.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA SI.
- B. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with minimum five years documented experience.
- C. Regulatory Requirements:
  - 1. Conform to requirements of NFPA 70.
  - 2. Products: Listed and classified by Underwriters Laboratories, Incorporated as suitable for purpose specified and indicated.

#### 1.5 MAINTENANCE

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Extra Products: At completion of installation, deliver to USPS Project Manager.
  - 1. Three of each size and type fuse installed.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Switches: Subject to compliance with project requirements, manufacturer's offering Products which may be incorporated in the Work include the following:
  - 1. General Electric Company (800) 626-2000.
  - 2. Siemens Energy & Automation, Alpharetta, GA (800) 964-4114.
  - 3. Square D Company, Palatine, IL (800) 392-8781.
  - 4. Eaton Corporation, Cutler-Hammer Products, Pittsburg, PA (800) 525-2000.
- B. Fuses: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Cooper Industries Incorporated, Waukesha, WI (414) 524-3300.
  - 2. General Electric Company (800) 626-2000.
  - 3. Gould Shawmut, Newburyport, MA (508) 462-6662.
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions not permitted.

#### 2.2 FUSIBLE ENCLOSED SWITCH ASSEMBLIES

- A. NEMA KS 1, Type HD heavy duty, 100,000 AIC load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Cover shall be equipped with a manual defeat to allow opening while energized by authorized personnel. Handle shall be lockable in ON or OFF position.
- B. Rating: 250 volts AC or 600 volts AC as indicated on Drawings.
- C. Fuse Clips: Designed to accommodate Class R fuses.
- D. Enclosures: NEMA KS 1.
  - 1. Interior Dry Locations: NEMA Type 1 or 12.
  - 2. Exterior Locations: NEMA Type 3R or 12.

- E. Provide factory ground lug and neutral block if required.

## 2.3 NONFUSIBLE SWITCH ASSEMBLIES

- A. NEMA KS 1, Type GD General Duty, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Cover shall be equipped with a manual defeat to allow opening while energized by authorized personnel. Handle shall be lockable in ON or OFF position.
- B. Rating: 250 volts AC or 600 volts AC as indicated on Drawings.
- C. Enclosures: NEMA KS 1.
  - 1. Interior Dry Locations: NEMA Type 1 or 12.
  - 2. Exterior Locations: NEMA Type 3R or 12.
- D. Provide factory ground lug and neutral block if required.

## 2.4 FUSES

- A. NEMA FU 1, Class RK1, dual element, current limiting, time delay, 250 volt AC or 600 volt AC as indicated on Drawings.
- B. Interrupting Rating: 100,000 rms amperes.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. As specified in Section 260500 - Common Work Results for Electrical.

### 3.2 INSTALLATION

- A. Switches:
  - 1. Install in accordance with manufacturers published instructions and NECA SI.
  - 2. Install where indicated on Drawings, where required by equipment, and where required by NFPA 70.
  - 3. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.
- B. Fuses:
  - 1. Install fuses in fusible switches in accordance with manufacturer's published instructions, as indicated on Drawings, or as required by loading per NFPA 70.
  - 2. Install fuse with label oriented with manufacturer, type, and size easily read.

### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

## SECTION 264128

### SURGE PROTECTIVE DEVICES (SPD)

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This section describes the materials and installation requirements for surge protective devices (SPD) for the protection of all power and communications circuits. Provide and install materials, labor and auxiliaries required to furnish and install complete surge suppression for the protection of building electrical and electronics systems from the effects of induced transient voltage surge and lightning discharge as indicated on drawings.
  - 1. Provide surge suppression devices for the following equipment:
    - a. Each main electrical service switchboard as indicated for on drawings.
    - b. Distribution and branch panels as indicated for on drawings.
    - c. All electronic communications equipment installed including but not limited to: fire alarm, intrusion, ePACS, CCTV, and paging systems.
  - 2. Provide surge suppression protection on all exterior lighting and communications systems wiring if the "expected lightning stroke frequency" exceeds the "tolerable lightning frequency" of the structure.
- B. Related documents: The contract documents, as defined in Section 011000-Summary of Work, apply to work of this section. Additional requirements and information necessary to complete the work of this section may be found in other documents.
- C. Related sections:
  - 1. Section 260500 – Common Work Results for Electrical.
  - 2. Section 262413 – Switchboards.
  - 3. Section 265600 – Exterior Lighting.

##### 1.2 REFERENCES

- A. IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits,
- B. IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits,
- C. IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits.
- D. National Electrical Code: Article 285.
- E. UL 1283 - Electromagnetic Interference Filters.
- F. UL 1449, 4th Edition, effective December 30, 2014 – Surge Protective Devices.

##### 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

2. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
  3. Certification submitted SPDs are manufactured in the United States.
  4. Shall include UL 1449 Listing documentation verifying the following:
    - a. Short Circuit Current Rating (SCCR)
    - b. Voltage Protection Ratings (VPRs) for all modes
    - c. Maximum Continuous Operating Voltage rating (MCOV)
    - d. I-nominal rating (I-n)
    - e. Type 1 Device Listing
      - 1) VPR, MCOV, I-n, and Type 1 information is posted at [www.UL.com](http://www.UL.com), under Certifications, searching using UL Category Code: VZCA. SCCR's are posted in manufacturer's UL docs.
      - 2) UL data and visual inspection takes precedence over manufacturer's published documentation.
- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals:
1. Project Record Documents: Record actual locations of Products; indicate actual branch circuit arrangement.
  2. Operation and Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.
  3. Submit data showing compliance with UL 1449 4th edition.

#### 1.4 QUALITY ASSURANCE

- A. SPDs must be manufactured in the United States.
- B. Manufacturer Qualifications: Engage a firm with at least 10 years experience in manufacturing transient voltage surge suppressors.
- C. Manufacturer shall be ISO 9001 or 9002 certified.
- D. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of 5 years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- E. The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One copy of this document to be provided with the equipment at time of shipment.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following.
  1. ASCO/Advanced Protection Technologies, Incorporated, Clearwater, FL (800) 237-4567
  2. Emerson/Liebert Corporation, Columbus, OH, (800) 877-9222
  3. Atlantic Scientific Corporation, Melbourne, FL, (800) 544-4737

4. Current Technology Inc., Irving, TX, (800) 238-5000
5. Ditek Surge Protection, Largo, FL, (800) 753-2345

B. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

## 2.2 SERVICE ENTRANCE SURGE PROTECTIVE DEVICES (SPDS)

A. Models:

1. Basis of Design: Advanced Protection Technologies: "TEXAS" Series.

B. Surge Protective Device Description: Replaceable module type complying with UL 1283 and UL 1449 4th Edition Listed. Provide unit with the following features and accessories:

1. LED indicator lights for power and protection status.
2. Audible alarm, with silencing switch, to indicate when protection has failed.
3. One set of dry contacts rated at 5.0 amperes, 240 volts ac, for remote monitoring of protection status.

C. Short Circuit Current Rating: SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.

D. SPD Type: SPD shall be UL labeled as Type 1 (verifiable at UL.com), intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.

E. In Rating: SPD shall be UL labeled with 20kA Inominal (I-n) (verifiable at UL.com) for compliance to UL 96A Lightning Protection Master Label and NFPA 780.

F. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G, and L-L in WYE systems, and L-L, L-G in DELTA Systems.

G. Minimum Single Impulse Surge Current Capability (single pulse rated) per phase shall be.

1. Single Impulse Surge Current Capacity is to be 300 kA.

H. Connection Means: Permanently wired via internal disconnect. The device shall have a NEMA designed and certified safety interlocked integral disconnect switch. The switch shall be located within the unit with an externally mounted metal manual operator.

I. Protection modes and UL 1449 4th Edition Voltage Protection Rating for grounded WYE circuits with voltages of 480Y/277, 3-phase, 4-wire shall be as follows:

<u>VOLTAGE</u>	<u>L-N</u>	<u>L-G</u>	<u>N-G</u>
208Y/120V	700V	700V	700V
480Y/277V	1500V	1500V	1500V

J. Install devices at service entrance at load side, with ground lead bonded to service entrance ground.

K. Test unit in accordance with manufacturer's written instructions.

## 2.3 DISTRIBUTION SURGE PROTECTIVE DEVICES (SPDS)

A. Models:

1. Basis of Design: Advanced Protection Technologies: "TEXDS" Series.



- B. Surge Protective Device Description: Non-modular type complying with UL 1283 and UL 1449 4th Edition Listed. Provide unit with the following features and accessories:
  - 1. LED indicator lights for power and protection status.
- C. Short Circuit Current Rating: SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.
- D. SPD Type: SPD shall be UL labeled as Type 1 (verifiable at UL.com), intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.
- E. In Rating: SPD shall be UL labeled with 20kA Inominal (I-n) (verifiable at UL.com).
- F. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G, and L-L in WYE systems, and L-L, L-G in DELTA Systems.
- G. Minimum Single Impulse Surge Current Capability (single pulse rated) per phase shall be.
  - 1. Single Impulse Surge Current Capacity is to be 150 kA.
- H. Connection Means: Permanently wired via internal disconnect. The device shall have a NEMA designed and certified safety interlocked integral disconnect switch. The switch shall be located within the unit with an externally mounted metal manual operator.
- I. Protection modes and UL 1449 4th Edition Voltage Protection Rating for grounded WYE circuits with voltages of 480Y/277, 3-phase, 4-wire shall be as follows:

VOLTAGE	L-N	L-G	N-G
208Y/120V	700V	700V	700V
480Y/277V	1500V	1500V	1500V

- J. Install devices as close as possible to distribution or branch panelboards.
- K. Test unit in accordance with manufacturer's written instructions.

2.4 FIRE ALARM AND SECURITY SYSTEM SURGE PROTECTIVE DEVICES (SPDS)

- A. Power Surge Protection
  - 1. SPD shall be listed or recognized in accordance with UL 1449 4th Edition verifiable by visiting UL.com.
  - 2. SPD shall provide surge current L-N or L-G mode of protection.
  - 3. Every mode of protection shall be protected by internal overcurrent and thermal overtemperature controls.
  - 4. SPD shall meet or exceed the following criteria:
    - a. Minimum surge current capability (single pulse rated) per phase shall be:
      - 1) 120/240 Panel Application 50kA per phase
    - b. UL 1449 4th Edition listed Voltage Protection Ratings for shall not exceed the following:

VOLTAGE	L-N/L-G	MCOV
120V or 240/120V	600V	150V

- 5. SPD shall have a warranty for a period of five years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period.

- B. Signal line protection
  - 1. SPD shall be solid state, silicon avalanche diode circuitry for protection from overvoltages on 2 or 4 wire signal lines such as balanced pair telephone, metallic pair telephone, buried and overhead

field cable, remote radio equipment, and control systems. Unit shall have an external ground lug or wire. Connect ground lug or wire to protected equipment grounding system with a No. 12 green insulated stranded ground wire as short as possible.

- a. Pins Protected: Pins 4, 5 on the RJ- 45 Interface; Pins 3, 4 on the RJ- 11 Interface.
- b. Clamping Voltage: 310 Volts in 500 nsec.
- c. Surge Capacity: 1500 Watts for 1 msec.
- d. Protection Mode:
  - 1) Common Mode Pins 4, 5 to shielding braid.
  - 2) Differential Mode Pins 4,5.
- e. Shall be listed to UL497A Telco Specification.

C. Video 75 ohm coaxial cable

- 1. Solid state, silicon avalanche diode circuitry for non-interrupting overvoltage protection of RG-59/U coaxial cable. Unit shall be provided with one female input connector for "F" series male connector, one output RG-59/U coax cable terminated with an "F" series male cable end connector and A #16 stranded, 18 inch long grounding wire on output end of unit or similar arrangement. Securely mount adjacent to protection equipment and ground to equipment or local building ground if an equipment ground is not available.
  - a. Normal Operating Characteristics
    - 1) Voltage .....5.8V max
    - 2) Current.....500ma max
    - 3) Frequency.....DC to 10 Mhz
    - 4) Insertion Loss.....3.5db @ 4Mhz
  - b. Protection Requirements
    - 1) Transient suppression level.....7.5v Voltage Protection Level
    - 2) Transient response.....<5 nanoseconds
    - 3) Operating temp.....-20o C to +50o C
    - 4) Energy dissipation.....15,000 watts (10X1000 Test Wave)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. As specified in Section 260500 - Common Work Results for Electrical.

3.2 INSTALLATION

- A. The installation shall meet the following criteria:
  - 1. Install per manufacturer's recommendations and contract documents.
  - 2. Install units plumb, level and rigid without distortion.
  - 3. One primary lightning arrestor shall be installed external to the service entrance in accordance with manufacturer instructions.
  - 4. Service Entrance SPD shall be installed on the load side of the main service disconnect.
  - 5. Service Entrance SPD ground shall be bonded to the service entrance ground.
  - 6. At Service Entrance, a UL approved disconnect switch shall be provided as a means of servicing if a 60A breaker is not available.
  - 7. One SPD shall be installed external to each designated distribution panelboard.
  - 8. At Distribution and Branch, SPD shall have an independent means of disconnect such that the protected panel remains energized. A 40A breaker (or larger) may serve this function.
  - 9. SPD shall be installed per manufacturer's installation instructions with lead lengths as short (less than 24") and straight as possible. Gently twist conductors together.
  - 10. Before energizing, installer shall verify service and separately derived system Neutral to Ground bonding jumpers per NEC.

### 3.3 ADJUSTMENTS AND CLEANING

- A. Remove debris from SPD and wipe dust and dirt from all components.
- B. Repaint marred and scratched surfaces with touch up paint to match original finish.

### 3.4 TESTING

- A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.
- B. Check all installed panels for proper grounding, fastening and alignment.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

SECTION 265100  
INTERIOR LIGHTING  
(LED - SOLID STATE)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Interior luminaires and accessories.
  - 2. Emergency lighting units.
  - 3. Exit signs.
  - 4. Ballast/Light emitting diode (LED) drivers.
  - 5. Light Sources.
  - 6. Luminaire accessories.
- B. Substitutions:
  - 1. Section 016000 - Product Requirements: Product substitutions permitted by manufacturers listed in Paragraph 2.1A.
- C. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- D. Related Sections:
  - 1. Section 260500 - Common Work Results for Electrical: Basic electrical methods.
  - 2. Section 260623 – Lighting Control Devices.

1.2 REFERENCES

- A. As specified in Section 260500 – Common Work Results for Electrical.
- B. Illuminating Engineering Society (IES):
  - 1. IES LM-79 - (2008) Electrical and Photometric Measurements of Solid-State Lighting Products.
  - 2. IES LM-80 - (2015) Measuring Lumen Maintenance of LED Light Sources.
  - 3. IES TM-21 - (2011; Addendum B 2015) Projecting Long Term Lumen Maintenance of LED Light Sources.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code.
  - 2. NFPA 101 - Life Safety Code.
- D. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA ANSILG C78.377 – (2017) Electric Lamps— Specifications for the Chromaticity of Solid State Lighting Products.
  - 2. NEMA SSL 1 – (2010) Electronic Drivers for Led Devices, Arrays, or Systems.
  - 3. NEMA SSL 3 - (2011) High-Power White LED Binning for General Illumination.
- E. Federal Communications Commission Parts 18.305, 18.307 (EMI RFI).
- F. American Society of Heating, Refrigerating and Air Conditioning, Inc.
  - 1. ANSI/ ASHRAE/ IES Standard 90.1.
- G. Underwriters Laboratories (UL)
  - 1. UL 1472 – (2015) UL Standard for Safety Solid-State Dimming Controls.

2. UL 1598 – (2008; Reprint Oct 2012) Luminaires.
3. UL 844 – (2012; Reprint Mar 2016) UL Standard for Safety Luminaires for Use in Hazardous (Classified) Locations.
4. UL 8750 – (2015; Reprint Feb 2018) UL Standard for Safety Light Emitting Diode (LED) Equipment for Use in Lighting Products.
5. UL 924 – (2016; Reprint Nov 2017) UL Standard for Safety Emergency Lighting and Power Equipment.

### 1.3 SUBMITTALS

- A. As specified in Section 260500 - Common Work Results for Electrical.
  1. Product Data: Submit catalog cuts, drawings, descriptive matter and lighting performance characteristics as required to completely define the materials and construction details employed, finishes applied, dimensions, hinging, latching and relamping provisions, and electrical characteristics.
  2. Assurance/Control Submittals:
    - a. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.
- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals:
  1. Operation and Maintenance Data: Submit manufacturer's operation and maintenance instructions for each type of luminaire.

### 1.4 DEFINITIONS

- A. For LED luminaire light sources, "Useful Life" is the operating hours before reaching 70 percent of the initial rated lumen output (L70) with no catastrophic failures under normal operating conditions. This is also known as 70 percent "Rated Lumen Maintenance Life" as defined in IES LM-80.
- B. For LED luminaires, "Luminaire Efficacy" (LE) is the appropriate measure of energy efficiency, measured in lumens/watt. This is gathered from LM-79 data for the luminaire, in which absolute photometry is used to measure the lumen output of the luminaire as one entity, not the source separately and then the source and housing together.
- C. Total harmonic distortion (THD) is the root mean square (RMS) of all the harmonic components divided by the total fundamental current.

### 1.5 QUALITY ASSURANCE

- A. As specified in section 260500 – Common Work Results for Electrical.
- B. Products shall be tested, approved and labeled/listed by Underwriters Laboratories, Inc., or by a nationally recognized testing laboratory (NRTL).
- C. Electrical equipment and materials shall be new and within one year of manufacture, complying with the latest codes and standards. Re-built, refurbished and/or re-manufactured electrical equipment and materials shall not be furnished on this project.

### 1.6 MAINTENANCE

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Extra Products: At completion of installation, deliver to the USPS Project Manager.

1. Two of each luminaire lens type.
2. Each component type: Provide quantity for each unique ballast/driver, and LED array equal to 2 percent of luminaire total, but not less than two of each type.

## PART 2 - PRODUCTS

### 2.1 LUMINAIRE MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
1. Alphabet Lighting, Tustin, CA (714) 259-9959.
  2. Beghelli, Miramar, FL (954) 442-6600.
  3. Chloride Systems, Burgaw, NC (910) 259-1000.
  4. Columbia Lighting, Greenville, SC (864) 678-1000.
  5. Cooper Lighting (Halo, Invue, Lumark, McGraw-Edison, Metalux, Portfolio, Sure-Lites), Peachtree City, GA (770)486-4800.
  6. Compass Lighting Products, Greenville, SC (866) 313-3909.
  7. Day-Brite, Tupelo, MS (662) 842-7212.
  8. Dual-Lite, Cheshire, CT (203) 699-2000.
  9. Edison-Price Lighting, Long Island City, NY (718) 685-0700.
  10. Elcast Lighting, Addison, IL (630) 543-5390.
  11. Evenlight, Trevoise, PA (800) 872-0879.
  12. Gardco Lighting, San Leandro, CA (800) 227-0758.
  13. GE Lighting Systems, Charlotte, NC (803) 462-2016.
  14. Gotham Lighting, Conyers, GA (800) 315-4982.
  15. Guth Lighting, St. Louis, MO (314) 533-3200.
  16. H.E. Williams, Carthage, MO (417) 358-4065.
  17. Holophane, Newark, OH (740) 345-9631.
  18. Hubbell Lighting, Inc., (Columbia, Spaulding, Sterner) Spartanburg, SC (864) 599-6000.
  19. Indy Lighting, Fishers, IN (317) 849-1233.
  20. Intense Lighting LLC, AnaheimAnaheim, CA (800) 691-5321.
  21. Kenall Manufacturing, Gurnee, IL (847) 360-8200.
  22. Killark Electric, Fenton, MO (314) 531-0460.
  23. Kirlin Lighting, Detroit, MI (313) 259-6400.
  24. Kramer Lighting, Sturtevant, WI (800) 236-6800.
  25. Kurt Versen Company, Westwood, NJ (201) 664-8200.
  26. Kurtzon Lighting, Chicago, IL (773) 277-2121.
  27. LaMar Lighting, Farming Dale, NY (631) 777-7700.
  28. LightAlarms (Thomas & Betts) Montreal, ON (888) 552-6467.
  29. Lithonia Lighting, Conyers, GA (770) 922-9000.
  30. LSI Industries, Cincinnati, OH (513) 793-3200.
  31. Lumax Industries, Altoona, PA (814) 944-2537.
  32. Omega Lighting, Tupelo, MS (800) 234-1890.
  33. Orion Energy Systems, Inc., Manitowoc, WI (800) 660-9340.
  34. Pheonix Products, Milwaukee, WI (414) 438-1200.
  35. Prescolite Lighting, Spartanburg, SC (864) 599-6000.
  36. Prudential Lighting, Los Angeles, CA (213) 746-0360.
  37. Vista Lighting, Tupelo, MS (662) 690-4105.

### 2.2 ZUMTOBEL STAFF, HIGHLAND, NY (800) 448-4131 LUMINAIRE TYPES

- A. Type A1: Lithonia # (Refer to Lighting Fixture Schedule on drawings).
1. Description: Recessed, 2 feet W x 4 feet L x 3 inch D LED type troffer with side reflectors and dropped acrylic center lens non-air handling.

2. Lens: High performance extruded acrylic diffuser with curved linear prisms.
  3. Housing:
    - a. 22 gauge steel body, flush steel door with mitered corners.
    - b. Frame and housing finished with baked white enamel or powder coated finish.
  4. Ballast/Driver: LED high efficiency – 24W and 3000 Lumen, 32W at 4000 Lumen, 38W at 5000 Lumen or 48W at 6000 Lumen. Wattage based on lumen package selected.
  5. Mounting:
    - a. Recessed in Inverted T suspended ceiling.
    - b. Recessed in gypsum board ceiling; provide flanged frame-in kit.
  6. Lamps: 3000 Lumen, 4000 Lumen, 5000 Lumen or 6000 Lumen LED array; 4000K rated 60,000 hours at LLD = 0.8.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Columbia.
    - b. Metalux.
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- B. Type A2: Lithonia # (Refer to Lighting Fixture Schedule on drawings).
1. Description: Recessed, 2 feet W x 2 feet L x 3 inch D LED type troffer with side reflectors and dropped acrylic center lens, non-air handling.
  2. Lens: High performance extruded acrylic diffuser with curved linear prism.
  3. Housing:
    - a. 22 gauge steel body, flush steel door with mitered corners.
    - b. Frame and housing finished with baked white enamel or powder coated finish.
  4. Ballast/Driver: LED high efficiency – 16W at 2200 Lumen, 27W at 3300 Lumen or 32W at 4100 Lumen. Wattage based on lumen package selected.
  5. Mounting:
    - a. Recessed in inverted T suspended ceiling.
    - b. Recessed in a gypsum board ceiling. Provide frame-in kit or plaster frame.
  6. Lamps: 2200 Lumen, 3300 Lumen or 4100 Lumen LED array; 4000K rated 60,000 hours at LLD = 0.8.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Columbia
    - b. Metalux
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- C. Type A3: Lithonia # (Refer to Lighting Fixture Schedule on drawings).
1. Description: Recessed, 1 foot W x 4 feet L x 3 inch D LED type troffer with side reflectors and dropped acrylic center lens, non-air handling.
  2. Lens: High performance extruded acrylic diffuser with curved linear prism.
  3. Housing:
    - a. 22 gauge steel body, flush steel door with mitered corners.
    - b. Frame and housing finished with baked white enamel or powder coated finish.
  4. Ballast/Driver: LED high efficiency – 12W at 1500 Lumen, 16W at 1900 Lumen, 24W at 3000 Lumen, 33W at 4100 Lumen, 40W at 5000 Lumen or 50W at 6100 Lumen. Wattage based on lumen package selected.
  5. Mounting:
    - a. Recessed in inverted T suspended ceiling.
    - b. Recessed in a gypsum board. Provide frame-in kit or plaster frame.
  6. Lamps: 1500 Lumen, 1900 Lumen, 3000 Lumen, 4100 Lumen, 5000 Lumen or 6100 Lumen LED array; 4000K rated 60,000 hours at LLD = 0.8.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Columbia
    - b. Metalux
    - c. Substitutions permitted: As listed in paragraph 2.1A.

- D. Type A5: Lithonia # (Refer to Lighting Fixture Schedule on drawings).
1. Description: 10 inch W x 4 feet L x 4 inch D surface volumetric LED luminaire, non-air handling.
  2. Refractor: Impact modified, linear – faceted refractor with diffusing film.
  3. Housing:
    - a. 20 gauge steel body with die-cast end caps.
    - b. White baked enamel or powder coated finish.
  4. Ballast/Driver: LED high efficiency – 20W at 2000 Lumen, 27W at 3200 Lumen, 35W at 4000 Lumen or 45W at 5100 Lumen. Wattage based on lumen package selected.
  5. Mounting: Surface ceiling mounted.
  6. Lamps: 2000 Lumen, 3200 Lumen, 4000 Lumen or 5100 Lumen LED array; 4000K rated 60,000 hours at LLD = 0.9.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Columbia
    - b. Metalux
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- E. Type A6: Lithonia # (Refer to Lighting Fixture Schedule on drawings).
1. Description: 5 inch W x 4 feet L x 3 7/8 inch D surface mounted LED luminaire, non-air handling.
  2. Refractor: Impact modified, linear – faceted refractor with diffusing film.
  3. Housing:
    - a. 20 gauge steel with die-cast end caps.
    - b. White polyester powder coated finish.
  4. Ballast/Driver: LED high efficiency – 19W at 2200 Lumen, 28W at 3200 Lumen or 40W at 4300 Lumen. Wattage based on lumen package selected.
  5. Mounting: Surface ceiling mounted.
  6. Lamps: 2200 Lumen, 3200 Lumen or 4300 Lumen LED array; 4000K rated 60,000 hours at LLD = 0.9.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Metalux
    - b. Columbia
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- F. Type B1: Kenall # (Refer to Lighting Fixture Schedule on drawings).
1. Description: 8 inches x 4 feet long enclosed and gasketed LED luminaire. UL listed for damp location.
  2. Lens: UV-stabilized, pearlescent, polycarbonate, smooth exterior and linear prism interior, 0.125 inches thick.
  3. Housing:
    - a. 20 gauge steel housing.
    - b. White polyester powder coated.
  4. Ballast/Driver: LED high efficiency – 49W at 5100 Lumen, 73W at 7800 Lumen or 97W at 10,000 Lumen. Wattage based on lumen package selected.
  5. Mounting: Surface ceiling or pendant mounted.
  6. Lamps: 5100 Lumen, 7800 Lumen or 10,000 Lumen LED array; 4000K rated 80,000 hours at LLD = 0.7 (5100L & 7800L), 60,000 hours at LLD = 0.7 (10,000L).
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Fail-Safe
    - b. Kurtzon
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- G. Type B2: Kenall # (Refer to Lighting Fixture Schedule on drawings).
1. Description: 8 inches x 8 feet long enclosed and gasketed LED luminaire. UL listed for damp location.
  2. Lens: UV-stabilized, pearlescent, polycarbonate, smooth exterior and linear prismatic interior, 0.125 inches thick.



3. Housing:
    - a. 20 Gauge steel housing.
    - b. White polyester powder coated.
  4. Ballast/Driver: LED high efficiency – (2) 49W at 5100 Lumen each, (2) 73W at 7800 Lumen each or (2) 97W at 10,000 Lumen each. Wattage based on lumen package selected.
  5. Mounting: Surface ceiling or pendant mounted.
  6. Lamps: (2) 5100 Lumen, (2) 7800 Lumen or (2) 10,000 Lumen LED arrays; 4000K rated 80,000 hours at LLD = 0.7 (5100L & 7800L), 60,000 hours at LLD = 0.7 (10,000L).
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Fail-Safe
    - b. Substitutions permitted: As listed in paragraph 2.1A.
- H. Type B3: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: 5 inch W x 2 feet L x 3 7/8 inch D, surface mounted, LED luminaire. UL listed for damp location.
  2. Refractor: Impact modified, linear-faceted refractor with diffusing film.
  3. Housing:
    - a. 20 ga. steel housing with die-cast end caps.
    - b. White polyester powder coated finish.
  4. Ballast/Driver: 18 Watt, 1900 Lumen.
  5. Mounting: Surface wall or ceiling.
  6. Lamp: 1900 Lumen, 4000K, LED array; 60,000 Hrs. at LLD = 0.9.
  7. Luminaire shall be equipped with integral occupancy sensor to control 50% high light output. Alternate Manufacturers:
  8. Metalux
  9. Columbia
  10. Columbia
  11. Orion (Apollo)
  12. Substitutions permitted: As listed in paragraph 2.1A.
  - 13.
- I. Type B4: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: 7" x 4 feet long enclosed and gasketed LED luminaire. UL listed for wet location.
  2. Lens: 4.5 inches Deep high impact, injection molded, acrylic lens; linear ribbed frosted, 0.08 inches thick.
  3. Housing:
    - a. One piece, 5 VA fiberglass housing with stainless steel latches.
    - b. NEMA 4x, IP65 rated.
  4. Ballast/Driver:
    - a. LED high efficiency – 18W at 2900 Lumen, 24W at 3800 Lumen, 38W at 5600 Lumen, 51W at 7400 Lumen or 62W at 9200 Lumen. Wattage based on lumen package selected.
    - b. Integral 10 KV/5 kA surge protection device.
  5. Mounting: Surface ceiling or wall mounted.
  6. Lamps: 2900 Lumen, 3800 Lumen, 5600 Lumen, 7400 Lumen or 9200 Lumen LED array; 4000K rated 60,000 hours at LLD = 0.8.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Metalux
    - b. Columbia
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- J. Type B5: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: 7" x 8 feet long enclosed and gasketed LED luminaire. UL listed for wet location.
  2. Lens: Deep high impact, injection molded, acrylic lens; linear ribbed frosted, 0.08 inches thick.
  3. Housing:
    - a. One piece, 5 VA fiberglass housing with stainless steel latches.

- b. NEMA 4x, IP65 rated.
  - 4. Ballast/Driver:
    - a. LED high efficiency – 54W at 8500 Lumen, 76W at 11,000 Lumen, 94W at 14,000 Lumen, 104W at 17,000 Lumen or 126W at 19,000 Lumen. Wattage based on lumen package selected.
    - b. Integral 10 KV/5 kA surge protection device.
  - 5. Mounting: Surface ceiling or wall mounted.
  - 6. Lamps: 8500 Lumen, 11,000 Lumen, 14,000 Lumen, 17,000 Lumen or 19,000 Lumen LED array; 4000K rated 60,000 hours at LLD = 0.8.
  - 7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  - 8. Alternate Manufacturers:
    - a. Metalux
    - b. Columbia
    - c. Substitutions: As listed in paragraph 2.1A.
- K. Type CL1: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
  - 1. Description; 4 feet long, LED strip luminaire with protective lens/diffuser.
  - 2. Lens: Snap on frosted, diffused lens.
  - 3. Housing:
    - a. 20 gauge cold rolled steel housing with punched knockouts for mounting.
    - b. End plates shall be die-formed heavy gauge rolled steel with punched knockouts for through wiring.
    - c. White baked enamel finish with a minimum 90 percent reflectance.
  - 4. Ballast/Driver: LED high efficiency – 25W at 3300 Lumen, 34W at 4600 Lumen or 52W at 6800 Lumen. Wattage based on lumen package selected.
  - 5. Mounting:
    - a. Surface mounted to the underside of the ceiling. Attach luminaire to ceiling grid by means of a gripper hanger which attaches to any standard ceiling grid system.
    - b. For spaces without ceiling, suspend from structure with all-thread rods to required height.
    - c. Electrical Contractor to determine quantity of hangers required for either method.
  - 6. Lamps: 3300 Lumen, 4600 Lumen or 6800 Lumen LED arrays; 4000K rated 60,000 hours at LLD = 0.7.
  - 7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  - 8. Alternate Manufacturers:
    - a. Columbia Lighting
    - b. Metalux
    - c. Orion (Harris)
    - d. Substitutions permitted: As listed in paragraph 2.1A.
- L. Type CL2: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
  - 1. Description; 2 feet long, LED strip luminaire with protective lens/diffuser.
  - 2. Lens: Snap on frosted, diffused lens.
  - 3. Housing:
    - a. 20 gauge cold rolled steel housing with punched knockouts for mounting.
    - b. End plates shall be die-formed heavy gauge rolled steel with punched knockouts for through wiring.
    - c. White baked enamel finish with a minimum 90 percent reflectance.
  - 4. Ballast/Driver: LED high efficiency – 15W at 1800 Lumen, 19W at 2400 Lumen or 31W at 3700 Lumen. Wattage based on lumen package selected.
  - 5. Mounting:
    - a. Surface mounted to the underside of the ceiling. Attach luminaire to ceiling grid by means of a gripper hanger which attaches to any standard ceiling grid system.
    - b. For spaces without ceiling, suspend from structure with all-thread rods to required height.
    - c. Electrical Contractor to determine quantity of hangers required for either method.
  - 6. Lamps: 1800 Lumen, 2400 Lumen or 3700 Lumen LED arrays; 4000K rated 60,000 hours at LLD = 0.7.
  - 7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  - 8. Alternate Manufacturers:

- a. Columbia Lighting
  - b. Metalux
  - c. Substitutions permitted: As listed in paragraph 2.1A.
- M. Type CL3: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
- 1. Description; 8 feet long, LED strip luminaire with protective lens/diffuser.
  - 2. Lens: Snap on frosted, diffused lens.
  - 3. Housing:
    - a. 20 gauge cold rolled steel housing with punched knockouts for mounting.
    - b. End plates shall be die-formed heavy gauge rolled steel with punched knockouts for through wiring.
    - c. White baked enamel finish with a minimum 90 percent reflectance.
  - 4. Ballast/Driver: LED high efficiency – 48W at 6800 Lumen, 68W at 9000 Lumen or 104W at 13,000 Lumen. Wattage based on lumen packages selected.
  - 5. Mounting:
    - a. Surface mounted to the underside of the ceiling. Attach luminaire to ceiling grid by means of a gripper hanger which attaches to any standard ceiling grid system.
    - b. For spaces without ceiling, suspend from structure with all-thread rods to required height.
    - c. Electrical Contractor to determine quantity of hangers required for either method.
  - 6. Lamps: 6800 Lumen, 9000 Lumen or 13,000 Lumen LED arrays, 4000K rated 60,000 hours at LLD=0.7.
  - 7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  - 8. Alternate Manufacturers:
    - a. Metalux
    - b. Columbia Lighting
    - c. Orion (Harris)
    - d. Substitutions permitted: As listed in paragraph 2.1A.
- N. Type EM1: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
- 1. Description: Ceiling mounted semi-recessed 10.5 inch square decorative halogen emergency light unit with nickel-cadmium battery. Provide with line latching, solid-state voltage limiting charger, solid-state switching, low voltage disconnect, brownout circuit, overload, short-circuit protection test switch and power indicator light.
  - 2. Lens: Lexan lens.
  - 3. Housing: Black thermoplastic body, UL924 listed, all components meet the UL 94-0.5VA flame retardant standard.
  - 4. Mounting: Provide with manufacturer rough-in kit for semi-recessed installation.
  - 5. Voltage: 277 / 120
  - 6. Lamps: 2 at 8W Tungsten Halogen (included)
  - 7. Alternate Manufacturers:
    - a. Substitutions permitted: As listed in paragraph 2.1A.
- O. Type EM2: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
- 1. Description: Compact contemporary design LED emergency lighting unit with adjustable heads and lithium iron phosphate battery. Provide with line latching, solid-state voltage limiting charger, solid-state switching, low voltage disconnect, brownout circuit, overload, short-circuit protection test switch and power indicator light.
  - 2. Battery: Sealed, maintenance free, lithium iron phosphate, 11 Watt at 9.6 volt.
  - 3. Housing: White thermoplastic body, UL924 listed, all components meet the UL 94-0.5VA flame retardant standard.
  - 4. Mounting: Wall mounted.
  - 5. Voltage: 277 / 120
  - 6. Lamps: 640 Lumens total, 2 at 3.3 Watt/9.6 Volt. (included).
  - 7. Alternate Manufacturers:
    - a. Beghelli
    - b. Evenlite
    - c. Dual-Lite
    - d. Substitutions permitted: As listed in paragraph 2.1A.

- P. Type EM3: (Refer to Lighting Fixture Schedule on drawings).
1. Description: Industrial design LED emergency lighting unit with adjustable heads and nickel cadmium battery. Provide with line latching, solid-state voltage limiting charger, solid-state switching, low voltage disconnect, brownout circuit, overload, short-circuit protection test switch and self-test/self-diagnostics.
  2. Battery: Sealed, maintenance free, nickel cadmium, 6 volt, with 42 Watt capacity.
  3. Housing: 20-gauge steel housing finished in white epoxy, powder coat finish, with hinged faceplate for ease of maintenance. UL924 listed, all components meet the UL 94-0.5VA flame retardant standard.
  4. Mounting: Wall mounted.
  5. Voltage: 277 / 120.
  6. Lamps: 2 at 5 Watt, PAR 18 LED (included).
  7. Alternate Manufacturers:
    - a. Beghelli
    - b. Dual-Lite
    - c. Lightalarms
    - d. Chloride
    - e. Beghelli
    - f. Dual-Lite
    - g. Lightalarms
    - h. Chloride
    - i. Substitutions permitted: As listed in paragraph 2.1A.
- Q. Type EM4 (exterior egress doors): Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Wall Mounted UL wet location LED emergency lighting unit
  2. Ballast/Driver: LED high efficiency – 2.5W at 635 Lumen LED (forward throw).
  3. Housing: UL listed wet location (NEMA 4X) low profile, die-cast aluminum, sealed and gasketed. Finish by the USPS Project Manager.
  4. Battery: Lithium iron phosphate with self-diagnostics. 32 to 122 degrees F (standard), -22 to 122 degrees F (cold weather) , wet locations.
  5. Mounting: Surface wall.
  6. Voltage: 277 120.
  7. Lamps: 2.5W at 635 Lumen LED array.
  8. Alternate Manufacturers:
    - a. Isolite
    - b. Compass
    - c. Compass
    - d. Sure-Lites
    - e. Substitutions permitted: As listed in paragraph 2.1A.
- R. Type R1: Gotham #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Recessed 4.5 inch dia. aperture LED downlight.
  2. Reflector: Low brightness, white painted, self-flanged reflector.
  3. Ballast/Driver: 8 Watt/750 Lumen, 9 Watt/1000 Lumen or 14 Watt/1500 Lumen LED light engine with remote phosphor technology; Wattage based on lumen package selected; 5-year factory warranty.
  4. Housing:
    - a. Frame to be 18 gauge galvanized steel ring.
    - b. Mounting ring shall be secured to grid ceiling bar hangers (supplied with luminaire).
    - c. Luminaire frame to be supported from the structure by at least two opposing corners.
  5. Junction Box:
    - a. Junction box to be code approved for through wiring.
    - b. Junction box to be secured to the mounting ring and accessible from two sides.
    - c. Junction box to be pre-wired and accessible per code through the ceiling trim opening.
  6. Mounting:
    - a. 24 inch grid ceiling bar hangers shall be supplied by manufacturer and securely fastened to grid.

- b. Provide 28 inch 'C' channel mounting bars and flange kit for drywall ceilings.
  - 7. Voltage: 277 / 120.
  - 8. Lamp: 750 Lumen, 1000 Lumen or 1500 Lumen, 4000K, remote phosphor enclosed LED array; 60,000 hours at LLD = 0.7.
  - 9. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  - 10. Alternate Manufacturers:
    - a. Portfolio
    - b. Prescolite Lighting
    - c. Substitutions permitted: As listed in paragraph 2.1A.
  
- S. Type R2: Gotham #(Refer to Lighting Fixture Schedule on drawings).
  - 1. Description: Recessed 4.5 inch dia. aperture LED wall washer type downlight.
  - 2. Reflector: Low brightness, white painted, self-flanged reflector.
  - 3. Ballast/Driver: 8 Watt/750 Lumen, 9 Watt/1000 Lumen or 15 Watt/1500 Lumen LED light engine with remote phosphor technology; Wattage based on lumen package selected; 5-year factory warranty.
  - 4. Housing:
    - a. Frame to be 18 gauge galvanized steel ring.
    - b. Mounting ring shall be secured to ceiling bar hangers (supplied with luminaire).
    - c. Luminaire frame to be supported from the structure by at least two opposing corners.
  - 5. Junction Box:
    - a. Junction box to be code approved for through wiring.
    - b. Junction box to be secured to the mounting ring and accessible from two sides.
    - c. Junction box to be pre-wired and accessible per code through the ceiling trim opening.
  - 6. Mounting:
    - a. 24 inch grid ceiling bar hangers shall be supplied by manufacturer and securely fastened to grid.
    - b. Provide 28 inch "C" channel mounting bars and flange kit for drywall ceiling.
  - 7. Voltage: 277 / 120.
  - 8. Lamp: 750 Lumen, 1000 Lumen or 1500 Lumen, 4000K, remote phosphor enclosed LED array; 60,000 hours at LLD = 0.7.
  - 9. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  - 10. Alternate Manufacturers:
    - a. Portfolio
    - b. Prescolite Lighting
    - c. Substitutions permitted: As listed in paragraph 2.1A.
  
- T. Type R5: Gotham #(Refer to Lighting Fixture Schedule on drawings).
  - 1. Description: Recessed 6 inch dia. aperture LED downlight.
  - 2. Reflector: Low brightness white painted, self-flanged reflector.
  - 3. Ballast/Driver: 10 Watt/1000 Lumen, 15 Watt/1500 Lumen or 20 Watt/2000 Lumen LED light engine with remote phosphor technology; Wattage based on lumen package selected; 5-year factory warranty.
  - 4. Housing:
    - a. Frame to be 18 gauge galvanized steel ring.
    - b. Mounting ring shall be secured to grid ceiling bar hangers (supplied with luminaire).
    - c. Luminaire frame to be supported from the structure by at least two opposing corners.
  - 5. Junction Box:
    - a. Junction box to be code approved for through wiring.
    - b. Junction box to be secured to the mounting ring and accessible from two sides.
    - c. Junction box to be pre-wired and accessible per code through the ceiling trim opening.
  - 6. Mounting:
    - a. 24 inch grid ceiling bar hangers shall be supplied by manufacturer and securely fastened to grid.
    - b. Provide 28 inch 'C' channel mounting bars and flange kit for drywall ceilings.
  - 7. Voltage: 277 / 120.

8. Lamp: 1000 Lumen, 1500 Lumen or 2000 Lumen, 4000K, remote phosphor enclosed LED array; 60,000 hours at LLD = 0.7.
  9. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  10. Alternate Manufacturers:
    - a. Portfolio
    - b. Prescolite Lighting
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- U. Type W1: Lithonia (Refer to Lighting Fixture Schedule on drawings).
1. Description: Cable/chain or pendant hung, 8 feet long, industrial LED, strip light luminaire, providing 10 percent uplighting with locking lamp holders and protective wireguards.
  2. Lens: Snap on frosted, diffused lens.
  3. Reflector: 8 feet long, symmetrical reflector with uplight #ZLR-L96-SYM-UPL-WH.
  4. Housing:
    - a. Channel and end plates of formed steel, 20 gauge material thickness.
    - b. Reflector and housing shall be white baked enamel with 90% minimum reflectance.
  5. Ballast/Driver: 60W at 8400 Lumen, 81W at 11,400 Lumen or 121W at 16,000 Lumen. Wattage based on lumen package selected.
  6. Mounting: Wire rope/chain from ceiling structure.
  7. Lamps: 8400 Lumen, 11,400 Lumen or 16,000 Lumen LED array; 4000K, 50,000 hours at LLD=0.7.
  8. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  9. Alternate Manufacturers:
    - a. Mercury
    - b. Lumax
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- V. Type W2: Lithonia # (Refer to Lighting Fixture Schedule on drawings).
1. Description: Cable/chain or pendant hung, 4 feet long single, industrial LED, strip light luminaire, providing 10 percent uplighting with locking lamp holders and protective wireguards.
  2. Lens: Snap on frosted, diffused lens.
  3. Reflector: 4 feet long, symmetrical reflector with uplight #ZLR-L48-SYM-UPL-WH.
  4. Housing:
    - a. Channel and end plates of formed 20 gauge steel.
    - b. Reflector and housing shall be white baked enamel with 90% minimum reflectance.
  5. Ballast/Driver: 30W at 4000 Lumen, 41W at 5500 Lumen or 59W at 7600 Lumen. Wattage based on lumen package selected.
  6. Mounting: Wire rope/chain from ceiling structure.
  7. Lamps: 4000 Lumen, 5500 Lumen or 7600 Lumen LED array; 4000K, 50,000 hours at LLD=0.7.
  8. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  9. Alternate Manufacturers:
    - a. Mercury
    - b. Lumax
    - c. Substitutions permitted: As listed in paragraph 2.1A.
- W. Type W3: Lithonia # (Refer to Lighting Fixture Schedule on drawings).
1. Description: Cable/chain or pendant hung, 8 feet long, enclosed and gasketed, LED low bay luminaire. U.L. listed for damp locations.
  2. Lens: 8 feet long, enclosed and gasketed diffused acrylic.
  3. Housing:
    - a. Full body housing and optical assembly of formed steel, 20 gauge material thickness.
    - b. Housing shall be high gloss, white baked enamel with 90% minimum reflectance.
    - c. Reflector: Internal, anodized, MIRO 5 high reflectance aluminum.
  4. Ballast/Driver: 58W at 7300 Lumen, 149W at 17,500 Lumen or 181W at 19,600 Lumen. Wattage based on lumen packages selected.
  5. Mounting: Wire rope/chain or pendant from ceiling structure.

6. Lamps: 7300 Lumen, 17,500 Lumen or 19,600 Lumen LED array; 4000K, 60,000 hours at LLD=0.94.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Metalux
    - b. Substitutions permitted: As listed in paragraph 2.1A.
- X. Type W4: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Cable/chain or pendant hung, 4 feet long, enclosed and gasketed, LED low bay luminaire. U.L. listed for damp locations.
  2. Lens: 4 feet long, enclosed and gasketed diffused acrylic
  3. Housing:
    - a. Full body housing and optical assembly of formed steel, 20 gauge material thickness.
    - b. Housing shall be high gloss, white baked enamel with 90% minimum reflectance.
    - c. Reflector: Internal, anodized, MIRO 5 high reflectance aluminum.
  4. Ballast/Driver: 29W at 3700 Lumen, 75W at 8700 Lumen or 86W at 9800 Lumen. Wattage based on lumen packages selected.
  5. Mounting: Wire rope/chain or pendant from ceiling structure.
  6. Lamps: 3700 Lumen, 8700 Lumen or 9800 Lumen LED array; 4000K, 60,000 hours at LLD=0.94.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. Metalux
    - b. Substitutions permitted: As listed in paragraph 2.1A.
- Y. Type W6: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Cable/chain or pendant hung 12 inches x 2 feet (nominal) long, high bay, industrial LED luminaire with wide beam distribution, and U.L. listed for damp locations.
  2. Lens: Semi-diffused polycarbonate for glare control.
  3. Housing:
    - a. Full body housing and optical assembly of formed steel, 20 gauge material thickness.
    - b. Housing shall be high gloss, white baked enamel with 90% minimum reflectance.
    - c. Reflectors: Injection molded acrylic.
    - d. Dimensions of housing dependent on lumen package selected.
  4. Ballast/Driver: 48W at 7500 Lumen thru 178W at 30,000 Lumen. Wattage based on lumen package selected.
  5. Mounting: Wire rope/chain or pendant from ceiling structure.
  6. Lamps: 7500 Lumen thru 30,000 Lumen LED array; 4000K, 60,000 hours at LLD=0.88.
  7. Marking: Luminaires are to be labeled on the interior side with lumen package used.
  8. Alternate Manufacturers:
    - a. General Electric
    - b. Orion (Ison)
    - c. Metalux
    - d. Columbia
    - e. Substitutions permitted: As listed in paragraph 2.1A.
- Z. Type X1: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Ceiling, end or wall mounted, single face LED exit sign with canopy. Self-powered and with self-diagnostics.
  2. Features: Red Letters, White Stencil, White Housing (verify colors with local jurisdiction). Injection molded UL94-5V rated polycarbonate frame and canopy.
  3. Mounting: Ceiling, back or end mounted.
  4. Battery: Maintenance free sealed Nickel Cadmium with long life, full recharge time of 24 hours max.
  5. Voltage: 277 / 120.
  6. Lamps: LED lamp module.
  7. Alternate Manufacturers:
    - a. Sure-Lites
    - b. Compass

c. Substitutions permitted: As listed in paragraph 2.1A.

AA. Type X2: Lithonia #(Refer to Lighting Fixture Schedule on drawings).

1. Description: Ceiling or end mount, double face LED exit sign with canopy. Self-powered and with self-diagnostics.
2. Features: Red Letters, White Stencil, White Housing (verify colors with local jurisdiction). Injection molded UL94-5V rated polycarbonate frame and canopy. Two bottom apertures snap out to emit downlight as required.
3. Mounting: Ceiling or end-mount.
4. Battery: Maintenance free sealed nickel-cadmium with long life, full recharge time of 24 hours maximum.
5. Voltage: 277 / 120.
6. Lamps: LED lamp module.
7. Alternate Manufacturers:
  - a. Sure-Lites
  - b. Compass
  - c. Substitutions permitted: As listed in paragraph 2.1A.

## 2.3 LUMINAIRES

A. Provide luminaires as indicated in luminaire schedule and details on project plans. Provide luminaires complete with light sources of quantity, type and wattage indicated. Provide all luminaires of the same type by the same manufacturer. Luminaires must be specifically designed for use with the driver or ballast and light source provided.

B. LED Luminaires:

1. Install ballast/drivers, LED arrays and specified accessories at the factory.
2. Luminaires must have a minimum 5 year manufacturer's warranty.
3. Luminaires must have a minimum L70 lumen maintenance value of 50,000 hours as calculated by IES TM-21, with data obtained per IES LM-80 requirements.
4. Luminaire drive current value must be identical to that provided by test data for luminaire in question.
5. Luminaires must be listed with the DesignLights Consortium 'Qualified Products List' when falling into category of "General Application" luminaires, i.e. Interior Directional, Display Case, Troffer, Linear Ambient, or Low/High Bay. Requirements are shown in the DesignLights Consortium "Technical Requirements Table" at <https://data.energystar.gov/dataset/EPA-Recognized-Laboratories-For-Lighting-Products/jgwf-7qrr>.
6. Provide Department of Energy 'Lighting Facts' label for each luminaire.

## 2.4 LED DRIVERS

A. NEMA SSL 1, UL 8750. LED drivers must be electronic, UL Class 1, constant-current type and comply with the following requirements:

1. Output power (watts) and luminous flux (lumens) as shown in luminaire schedule for each luminaire type to meet minimum luminaire efficacy (LE) value provided.
2. Power Factor (PF) greater than or equal to 0.9 over the full dimming range when provided.
3. Current draw Total Harmonic Distortion (THD) of less than 20 percent.
4. Class A sound rating.
5. Operable at input voltage of 120-277 volts at 60 hertz.
6. Minimum 5 year manufacturer's warranty.
7. RoHS compliant.
8. Integral thermal protection that reduces or eliminates the output power if case temperature exceeds a value detrimental to the driver.
9. UL listed for dry or damp locations typical of interior installations.
10. LED driver shall tolerate sustained open circuit and short circuit output conditions without damage.



11. LED driver shall comply with the requirements of the FCC rules and regulations, Title 47 CFR Part 15 Non-Consumer (Class A).

## 2.5 LIGHT SOURCES

- A. NEMA ANSLG C78.377, NEMA SSL 3. Provide type and wattage as indicated in luminaire schedule on project plans.
- B. LED arrays shall have a correlated color temperature (CCT) of 4000K; minimum color rendering index (CRI) value of 80.
- C. High power, white light output utilizing phosphor conversion (PC) process or mixed system of colored LEDs, typically red, green and blue (RGB).
- D. Provide light source color consistency by utilizing a binning tolerance within a 4 step McAdam ellipse.
- E. Luminaire shall have door frame and lens compatible for use with LED arrays and integral airflow ventilation system.

## 2.6 LED EMERGENCY DRIVERS

- A. Provide LED emergency driver with automatic power failure detection, test switch and LED indicator (or combination switch/indicator) located on luminaire exterior and provide self-diagnostic function integral to emergency driver. Integral nickel cadmium or lithium iron phosphate battery is required to supply a minimum of 90 minutes of emergency power at 700 Lumens (at 100 Lumens/Watt). Driver must be RoHS compliant, rated for installation in plenum-rated spaces and damp locations, and be warranted for a minimum of five years.

## 2.7 LUMINAIRE SUPPORT HARDWARE

- A. Wire:
  1. ASTM A641/A641M; Galvanized, soft tempered steel, minimum 0.11 inches in diameter, or galvanized, braided steel, minimum 0.08 inches in diameter.
- F. Threaded Rods:
  1. Threaded steel rods, 3/16 inch diameter, zinc or cadmium coated.
- G. Straps:
  1. Galvanized steel, one inch by 3/16 inch, conforming to ASTM A653/A653M, with a light commercial zinc coating or ASTM A1008/A1008M with an electrodeposited zinc coating conforming to ASTM B633, Type RS.

## 2.8 EQUIPMENT IDENTIFICATION

- A. Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.
- B. Provide labeled luminaires in accordance with UL 1598 requirements. All luminaires must be clearly marked for operation of specific light sources and ballasts or drivers. Note the following light source characteristics in the format "Use Only \_\_\_\_\_":
  1. Correlated color temperature (CCT) and color rendering index (CRI) for all luminaires.

2. All markings related to light source type must be clear and located to be readily visible to service personnel, but unseen from normal viewing angles when light sources are in place. Ballasts or drivers must have clear markings indicating multi-level outputs and indicate proper terminals for the various outputs.

## 2.9 FACTORY APPLIED FINISH

- A. Provide all luminaires and lighting equipment with factory-applied painting system that as a minimum, meets requirements of NEMA 250 corrosion-resistance test.

## 2.10 RECESS- AND FLUSH-MOUNTED LUMINAIRES

- A. Provide access to lamp and ballast from bottom of luminaire. Provide trim for the exposed surface of flush-mounted luminaires as indicated on project drawings and specifications.

## 2.11 SUSPENDED LUMINAIRES

- A. Provide hangers capable of supporting twice the combined weight of luminaires supported by hangers. Provide with swivel hangers to ensure a plumb installation. Provide cadmium-plated steel with a swivel-ball tapped for the conduit size indicated. Hangers must allow fixtures to swing within an angle of 45 degrees. Brace pendants 4 feet or longer to limit swinging. Single-unit suspended luminaires must have twin-stem hangers. Multiple-unit or continuous row luminaires must have a tubing or stem for wiring at one point and a tubing or rod suspension provided for each unit length of chassis, including one at each end. Provide rods in minimum 0.25 inch diameter.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. As specified in Section 260500 – Common Work Results for Electrical.

### 3.2 INSTALLATION

- A. Electrical installations must conform to IEEE C2, NFPA 70, and to the requirements specified herein. Install luminaires to meet the requirements of ASHRAE 90.1 and ASHRAE 189.1. To encourage consistency and uniformity, install luminaires of the same manufacture and model number when residing in the same facility or building.
- B. Luminaires:
  1. Set luminaires plumb, square, and level with ceiling and walls, in alignment with adjacent luminaires and secure in accordance with manufacturers' directions and approved drawings. Installation must meet requirements of NFPA 70. Obtain approval of the exact mounting height on the job before commencing installation and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed.
  2. Recessed and semi-recessed luminaires must be independently supported from the building structure by a minimum of four wires, straps or rods per luminaire and located near each corner of the luminaire. Ceiling grid clips are not allowed as an alternative to independently supported luminaires.
  3. Round luminaires or luminaires smaller in size than the ceiling grid must be independently supported from the building structure by a minimum of two wires, straps or rods per luminaire, spaced approximately equidistant around. Do not support luminaires by acoustical tile ceiling panels.

- a. Where luminaires of sizes less than the ceiling grid are indicated to be centered in the acoustical panel, support each independently and provide at least two 3/4 inch metal channels spanning, and secured to, the ceiling tees for centering and aligning the luminaire. Provide wires, straps, or rods for luminaire support in this section.
- C. Suspended Luminaires:
- 1. Provide suspended luminaires with swivel hangers so that they hang plumb and level. The stem, canopy and luminaire must be capable of 45 degree swing. Pendants, rods, or chains, 4 feet or longer excluding luminaire, must be braced to prevent swaying using three cables at 120 degree separation.
  - 2. Suspended luminaires in continuous rows must have internal wireway systems for end to end wiring and must be properly aligned to provide a straight and continuous row without bends, gaps, light leaks or filler pieces.
  - 3. Match supporting pendants with supported luminaire. Aircraft cable must be stainless steel. Canopies must be finished to match the ceiling and must be low profile unless otherwise shown.
  - 4. Maximum distance between suspension points must be 10 feet or as recommended by the manufacturer, whichever is less.
- D. Locate ceiling luminaires as indicated on reflected ceiling plan.
- E. Install surface mounted luminaires and exit luminaire signs plumb and adjust to align with building lines and with each other. Secure to prevent movement. Mount exit signs to outlet box mounted flush in wall or ceilings. Outlet box for ceiling mounted exit signs: Connect to rigid conduit system.
- F. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating. In fire rated ceilings, recessed luminaires must carry 1 hour UL fire rating classification.
- G. Install earthquake clips to secure recessed grid-supported luminaires in place.
- H. Install wall mounted luminaires, emergency lighting units and exit luminaire signs at height as scheduled.
- I. Install accessories furnished with each luminaire.
- J. Bond products and metal accessories to branch circuit equipment grounding conductor.
- K. Install specified light sources in each emergency lighting unit, exit luminaire sign, and luminaire.
- L. Wire exit signs and emergency lighting units ahead of the local switch, to the normal lighting circuit located in the same room or area.
- M. Luminaire whips shall be steel or aluminum. M/C cable shall be permissible for luminaire whips/connections. Luminaire whips/connections shall be made with a minimum of #12 AWG copper conductors. Equipment grounding conductors shall be provided in all luminaire whips and/or connections.
- 1. All luminaire whips shall be supported to luminaire support wire/cable with an approved fastener equal to an Erico "KX" flexible conduit hanger or other UL listed supports and fasteners.
- N. Luminaires are not to be used as a raceway unless stamped for use as raceway by manufacturer. Single luminaire in lay-in ceilings shall not be used for raceway and shall be connected to an outlet box located within six feet (6') of fixture with flexible conduit or luminaire whips.

### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

- C. Final acceptance will be based on measurement of initial lighting levels after required hours of burn in as specified in USPS Mail Processing Facility Design Criteria, not maintained lighting levels.

#### 3.4 WARRANTY

- A. Provide a written 5 year on-site replacement warranty for material, luminaire finish, and workmanship. On-site replacement includes transportation, removal, and installation of new products.
  - 1. Include finish warranty to include failure and substantial deterioration such as blistering, cracking, peeling, chalking, or fading.
  - 2. Material warranty must include:
    - a. All drivers.
    - b. Replacement when more than 10 percent of LED sources in any lightbar or subassembly are defective or non-starting.
- B. Warranty period must begin on date of beneficial occupancy. Provide the USPS Project Manager with signed warranty certificates prior to final payment.

#### 3.5 ADJUSTING

- A. Aim and adjust luminaires as directed by the USPS Project Manager.
- B. Position exit luminaire sign directional arrows as indicated.

#### 3.6 CLEANING

- A. Section 017300 - Execution: Cleaning installed work.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

SECTION 265600  
EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Exterior luminaires and accessories.
  - 2. Poles.
  - 3. Ballast/Drivers.
- B. Substitutions:
  - 1. Section 016000 – Product Requirements: Product substitutions permitted by manufacturers listed in Paragraph 2.1A.
- C. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the work of this section. Additional requirements and information necessary to complete the work of this section may be found in other documents.
- D. Related Sections
  - 1. Section 033000 - Cast-in-Place Concrete: Concrete for pole foundation.
  - 2. Section 260500 - Common Work Results for Electrical: Basic electrical methods.
  - 3. Section 260623 - Lighting Control Devices.

1.2 REFERENCES

- A. As referenced in Section 260500 – Common Work Results for Electrical.
- B. Illuminating Engineering Society North America (IESNA):
  - 1. IESNA RP-8 - Recommended Practice for Roadway Lighting.
  - 2. IESNA RP-20 – Recommended Practice for Lighting for Parking Facilities.
  - 3. IESNA RP-33 - Recommended Practice for Lighting for Exterior Environments.
- C. Federal Communications Commission Parts 18.305, 18.307 (EMI RFI).
- D. American Society of Heating, Refrigerating and Air Conditioning, Inc.
  - 1. ANSI/ ASHRAE/ IES Standard 90.1.

1.3 SUBMITTALS

- A. As specified in Section 260500 – Common Work Results for Electrical.
  - 1. Product Data:
    - a. Luminaire dimensions, ratings, and performance data.
    - b. Complete computer data printout of illumination levels based on a 5 by 5 foot grid pattern.
  - 2. Shop Drawings:
    - a. Indicate dimensions and components for each luminaire which is not a standard Product of the manufacturer.
    - b. Indicate illumination levels in accordance with layout and scheduled luminaires indicated on Drawings.

#### 1.4 QUALITY ASSURANCE

- A. As specified in Section 260500 – Common Work Results for Electrical.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. As specified in Section 260500 – Common Work Results for Electrical.

#### 1.6 MAINTENANCE

- A. Section 017704 – Closeout Procedures and Training: Procedures for closeout submittals.
- B. Extra Products: At completion of installation, deliver to the USPS Project Manager.
  - 1. Each component type: Provide quantity for each unique ballast/driver, and LED array equal to 2 percent of luminaire total, but not less than two of each type.

### PART 2 - PRODUCTS

#### 2.1 LUMINAIRE MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Alphabet Lighting, Tustin, CA (714) 259-9959.
  - 2. Architectural Landscape Lighting, Santa Ana, CA 92704 (714) 668-1107.
  - 3. Barron Lighting Group (Trace-Lite), Phoenix, AZ 85027 (888) 533-3948.
  - 4. Bronzelite Commercial Landscape Lighting, (800) 273-1569.
  - 5. CGF Design Inc., Morton Grove, IL (847) 815-5079.
  - 6. Cooper Lighting (Invue, Lumark, Lumiere, Portfolio, McGraw-Edison, Portfolio), Peachtree City, GA (770)486-4800.
  - 7. Deco Lighting, Commerce, CA (800) 613-3326.
  - 8. Gardco/Philips Lighting, San Leandro, CA (800) 227-0758.
  - 9. GE Lighting Systems, Charlotte, NC (803) 462-2016.
  - 10. Gotham Lighting, Conyers, GA (800) 315-4982.
  - 11. Hadco Lighting, Littlestown, PA (717) 359-7131.
  - 12. H.E. Williams, Carthage, MO (417) 358-4065.
  - 13. Holophane, Newark, OH (740) 345-9631.
  - 14. Hydrel Architectural and Landscape Products, Sylmar, CA 91342 (818) 362-9465.
  - 15. Hubbell Lighting, Inc., (KIM, Spaulding,) Spartanburg, SC (864) 599-6000.
  - 16. Intense Lighting, Anaheim, CA (800) 961-5322.
  - 17. Kenall Manufacturing, Gurnee, IL (847) 360-8200.
  - 18. Kim Lighting, City of Industry, CA (626) 968-5666.
  - 19. Kirlin Lighting, Detroit, MI (313) 259-6400.
  - 20. Ligman Lighting USA, Hillsboro, OR (503) 645-0500.
  - 21. Lithonia Lighting, Conyers, GA (770) 922-9000.
  - 22. LSI Industries, Cincinnati, OH (513) 793-3200.
  - 23. McPhilben Lighting, San Leandro, CA (510) 357-6900.
  - 24. Pathway Lighting, Old Saybrook, CT (800) 342-0592.
  - 25. Quality Lighting, Franklin Park, IL (847) 451-0090.
  - 26. Visionaire Lighting, Rancho Dominguez, CA (310) 512-6480.
  - 27. Wide-Lite, San Marcos, TX (512) 392-5821.

## 2.2 LUMINAIRE TYPES

- A. Type MH3 (exterior): Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: 18 inch diameter half cylinder wall mounted full cut-off, solid state, LED luminaire. Lens door is fully gasketed with one-piece solid silicone and UL listed for wet locations.
  2. Lens: Precision molded acrylic.
  3. Housing: Die-cast single piece aluminum housing. Finish by the USPS Project Manager.
  4. Ballast/Driver: 20W at 2200 Lumen, 29W at 3000 Lumen, 40W at 4500 Lumen or 61W at 6000 Lumen. Wattage based on lumen package selected.
  5. Mounting: Surface wall.
  6. Voltage: 277 / 120.
  7. Lamp: 2200 Lumen, 3000 Lumen, 4500 Lumen or 6000 Lumen LED array; 4000K, 60,000 hours @ LLC = 0.9.
  8. Label: UL listed for wet locations; IP65 rated.
  9. Warranty: Full five (5) year factory replacement warranty (internal components).
  10. Alternate Manufacturers:
    - a. Gardco/Philips #104L-XXL-XXX-NW-G1-X.
    - b. Hubbell #QSP2-XXL-XX-4K7-UNV-DBT.
    - c. Lithonia #WSRLED-XX-40K-SRX.
    - d. McGraw Edison #ISS-AF-XXX-LED-E1-XXX.
    - e. Barron Trace-Lite #TLED111P-XX-VS.
    - f. Deco Lighting #D440-LED-XX-40-UNV-D-XX.
    - g. Substitution permitted: As listed in paragraph 2.1A.
- B. Type PL1 (exterior): Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Low profile, square, full cut-off canopy light U.L. listed for wet locations.
  2. Housing/Lens: Die-cast aluminum housing with tempered, flat glass lens and pressure stabilizing vent. Finish by USPS Project Manager.
  3. Ballast/Driver: 26W at 2700 Lumen thru 107W at 11,000 Lumen. Wattage based on lumen package selected.
  4. Mounting: **Surface mounted with recessed outlet box**
  5. Lamp: 2700 Lumen thru 11,000 Lumen LED array; 4000K, 60,000 hours; LLD=0.85.
  6. Voltage: 277 / 120.
  7. Label: U.L. listed for wet locations; IP66 rated with 5-year factory warranty.
  8. Alternate manufacturers:
    - a. Philips/Gardco #SFCX-DD-5W-48L-XXX-NW-G2.
    - b. Deco Lighting #D533-PRO-XXX-XX-40-U-5-SU.
    - c. Deco Lighting #533R-PRO-XX-40-U-5 (recessed only).
    - d. McGraw-Edison #CNC-XXX-LED-E1-XX.
    - e. McGraw-Edison #LRC-B-XX-X-LED-E1-XXX (recessed only).
    - f. Substitution permitted: As listed in paragraph 2.1A.
- C. Type PL2 (exterior): (Refer to Lighting Fixture Schedule on drawings).
1. Description: Slim, low profile, wall mounted, full cut-off LED luminaire. U.L. listed for wet locations.
  2. Housing/Lens: Die-cast aluminum housing with flat glass bottom lens.
  3. Ballast/Driver: 12W at 1400 Lumen, 18W at 2100 Lumen, 26W at 2700 Lumen or 38W at 4200 Lumen. Wattage based on lumen package selected.
  4. Mounting: Surface, wall mounted with recessed outlet box - 4 inch profile.
  5. Lamp: 1400 Lumen, 2100 Lumen, 2700 Lumen or 4200 Lumen LED array; 4000K, 72,000 hours; LLD=0.90.
  6. Voltage: 277 / 120.
  7. Label: U.L. listed for wet locations; 5 year factory warranty.
  8. Alternate manufacturers:
    - a. Hubbell #SG1-XX-4K7-FT-UNV Series.
    - b. Substitution permitted: As listed in paragraph 2.1A.

- D. Type PL3 (exterior): Gotham #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Recessed 6 inch diameter aperture LED downlight.
  2. Reflector: Low brightness white painted, self-flanged reflector.
  3. Ballast/Driver: 10W at 1000 Lumen thru 176W at 17,500 Lumen. Wattage based on lumen package selected.
  4. Mounting Frame: Frame to be 18 gauge galvanized steel ring. Mounting ring shall be secured to ceiling hangers (supplied with luminaire). NOTE: Luminaire frame to be supported from the structure by at least two opposing corners.
  5. Junction Box: Junction box to be code approved for through wiring. Junction box to be secured to the mounting ring and accessible from two sides. Junction box to be pre-wired and accessible per code through the ceiling trim opening.
  6. Mounting: 28 inch 'C' channel mounting bars and flange kit for drywall ceilings.
  7. Voltage: 277 / 120.
  8. Lamp: 1000 Lumen thru 17,500 Lumen LED array; 4000K, 60,000 hours at LLD = 0.7.
  9. Label: U.L. listed for damp locations; 5-year factory warranty.
  10. Alternate Manufacturers:
    - a. Portfolio #LD6BXXD010-EU6B Series.
    - b. Prescolite #LTR-6RD-H-XX-XXL-DM1 LTR-6RD-T-XX-40K-8-MD-WC.
    - c. Substitution permitted: As listed in paragraph 2.1A.
- E. Type PL4 (exterior): (Refer to Lighting Fixture Schedule on drawings).
1. Description: 13 inch diameter, low profile, round, wall mounted, full cut-off LED luminaire.
  2. Reflector: High efficiency, semi-specular aluminum.
  3. Lens: Pearlescent, U.V. stabilized, high impact resistant, virgin injection molded polycarbonate.
  4. Finish: Finish by the USPS Project Manager.
  5. Recessed Housing: 18 gauge, cold rolled steel.
  6. Ballast/Driver: 13W at 1100 Lumen or 24W at 2200 Lumen. Wattage based on lumen package selected.
  7. Mounting: Semi-recessed, wall mounted; A.D.A. compliant.
  8. Voltage: 277 / 120.
  9. Lamp: 1100 Lumen or 2200 Lumen LED array; 4000K, 60,000 hours at LLD = 0.7.
  10. Label: U.L. listed for damp locations; 5-year factory warranty.
  11. Alternate manufacturers:
    - a. Cooper/Fail-Safe #TRX-15-LD4-XXW-40 Series.
    - b. KIM #WF31X-X-XXL2KUV Series.
    - c. CGF Design #GB-4-LEDXX-CT4-UNV-0-10D Series.
    - d. Substitution permitted: As listed in paragraph 2.1A.
- F. TYPE PL5: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: Pendant 6 inch diameter, aperture LED downlight.
  2. Reflector: Low brightness, matte-diffused, clear specular alzak finish.
  3. Housing: Heavy gauge aluminum cylinder, finished white. Pendant hung on a 24 inch stem with a swivel canopy.
  4. Ballast/Driver: 6W at 530 Lumen thru 58W at 5000 Lumen. Wattage based on lumen package selected.
  5. Mounting: Pendant or surface mounted.
  6. Voltage: 277 / 120.
  7. Lamp: 530 Lumen thru 5000 Lumen LED array; 4000K, 60,000 hours at LLD = 0.7.
  8. Label: U.L. listed for wet locations; 5-year factory warranty.
  9. Alternate manufacturers:
    - a. Prescolite #LTC-6RD-X-XXL-40K-8-MD-DM1-SS-WH.
    - b. Pathway #C68XLB79V-XX-4K.
    - c. Kirlin #LSR-12484-XXXL.
    - d. Portfolio #LER6B Series.
    - e. Substitution permitted: As listed in paragraph 2.1A.



- G. Type SP1: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: 13 inch W x 26 inch L x 3 inch H, low profile, rectilinear architectural arm-mounted sharp cut-off, solid state, LED luminaire.
  2. Reflector: Anodized segmented reflectors, beam distribution as required.
  3. Housing: Rugged aluminum rectilinear housing with all seams continuously welded for integrity. Corrosion-resistant polyester powder coat. Finish by the USPS Project Manager.
  4. Ballast/Driver: 38W at 4700 Lumen thru 166W at 18,000+ Lumen. Wattage based on lumen package selected.
  5. Mounting: 20 to 25 feet high square, tapered aluminum pole.
  6. Voltage: 480 / 277
  7. Lamp: 4700 Lumen thru 18,000+ Lumen LED array; 4000K, 60,000 hours @ LLD = 0.7.
  8. Quantity of luminaires per pole as shown on the design drawings.
  9. Published Life: 60,000 hours at 70 percent lumen depreciation.
  10. Label: UL listed for wet locations.
  11. Warranty: Full five (5) year factory replacement warranty (internal components).
  12. Alternate Manufacturers:
    - a. Hubbell #ASL1-XXXL-XXX-4K7-X-UNV-A-XXX.
    - b. McGraw-Edison #GLEON-SAXX-740 Series.
    - c. Substitution permitted: As listed in paragraph 2.1 A.
- H. Type SP2: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: 13 inch W x 33 inch L x 3-1/2 inch H, large, low profile, rectilinear architectural arm-mounted full cut-off, solid state, LED luminaire.
  2. Reflector: Anodized segmented reflectors. Beam distribution as required.
  3. Housing: Rugged aluminum rectilinear housing with all seams continuously welded for integrity. Corrosion-resistant polyester powder coat. Finish by contracting officer through the USPS Project Manager.
  4. Ballast/Driver: 54W at 7000 Lumen thru 241W at 27,000+ Lumen. Wattage based on lumen package selected.
  5. Mounting: 20 to 25 feet high, square, tapered aluminum pole.
  6. Voltage: 480 / 277.
  7. Lamp: 7000 Lumen to 27,000+ Lumen LED array; 4000K, 60,000 hours @ LLD = 0.7.
  8. Quantity of luminaires per pole as shown on the design drawings.
  9. Label: UL listed for wet locations.
  10. Warranty: Full five (5) year factory replacement warranty (internal components).
  11. Alternate Manufacturers:
    - a. Hubbell #ASLX-XXXL-XXX-4K7-X-UNV-A-XXX .
    - b. McGraw-Edison #GLEON-SAXX-740 Series.
    - c. Substitution permitted: As listed in paragraph 2.1 A.
- I. Type SP5: Lithonia #(Refer to Lighting Fixture Schedule on drawings).
1. Description: 13 inch W x 26 inch L x 3 inch H, low profile, rectilinear architectural arm-mounted full cut-off, solid state, LED luminaire.
  2. Reflector: Anodized segmented reflectors. Beam distribution as required.
  3. Housing: Rugged aluminum rectilinear housing with all seams continuously welded for integrity. Corrosion-resistant polyester powder coat. Finish by contracting officer through the USPS Project Manager.
  4. Ballast/Driver: 38W at 4700 Lumen thru 166W at 18,000+ Lumen, 1000 mA.
  5. Mounting: 12 to 15 feet high, square aluminum pole.
  6. Voltage: 480 / 277.
  7. Lamp: 4700 Lumen thru 18,000+ Lumen LED array; 4000K, 60,000 hours @ LLD = 0.7.
  8. Quantity of luminaires per pole as shown on the design drawings.
  9. Label: UL listed for wet locations.
  10. Warranty: Full five (5) year factory replacement warranty (internal components).
  11. Alternate Manufacturers:
    - a. Hubbell #ASL1-XXXL-XXX-4K7-X-UNV-A-XXX.
    - b. McGraw-Edison #GLEON-SAXX-740 Series.
    - c. Substitutions permitted: As listed in paragraph 2.1 A.

## 2.3 LUMINAIRES

- A. Provide luminaires as indicated in luminaire schedule and details on project plans. Provide luminaires complete with light sources of quantity, type and wattage indicated. Provide all luminaires of the same type by the same manufacturer. Luminaires must be specifically designed for use with the driver or ballast and light source provided.
- B. LED Luminaires:
  - 1. Install ballast/drivers, LED arrays and specified accessories at the factory.
  - 2. Luminaires must have a minimum 5 year manufacturer's warranty.
  - 3. Luminaires must have a minimum L70 lumen maintenance value of 50,000 hours as calculated by IES TM-21, with data obtained per IES LM-80 requirements.
  - 4. All luminaires shall be fused. Locate fuses within handhole of pole for pole mounted luminaires.
  - 5. Voltage: [480] [277] [208] [120].

## 2.4 LED DRIVERS

- A. NEMA SSL 1, UL 8750. LED drivers must be electronic, UL Class 1, constant-current type and comply with the following requirements:
  - 1. Output power (watts) and luminous flux (lumens) as shown in luminaire schedule for each luminaire type to meet minimum luminaire efficacy (LE) value provided.
  - 2. Power Factor (PF) greater than or equal to 0.9 over the full dimming range when provided.
  - 3. Current draw Total Harmonic Distortion (THD) of less than 20 percent.
  - 4. Class A sound rating.
  - 5. Operable at input voltage of 120-277 volts at 60 hertz.
  - 6. Minimum 5-year manufacturer's warranty.
  - 7. RoHS compliant.
  - 8. Integral thermal protection that reduces or eliminates the output power if case temperature exceeds a value detrimental to the driver.
  - 9. UL listed for wet locations typical of exterior installations.
  - 10. LED driver shall tolerate sustained open circuit and short circuit output conditions without damage.
  - 11. LED driver shall comply with the requirements of the FCC rules and regulations, Title 47 CFR Part 15 Non-Consumer (Class A).

## 2.5 LIGHT SOURCES

- A. NEMA ANSLG C78.377, NEMA SSL 3. Provide type and wattage as indicated in luminaire schedule on project plans.
- B. LED arrays shall have a correlated color temperature (CCT) of 4000K; minimum color rendering index (CRI) value of 70.
- C. High power, white light output utilizing phosphor conversion (PC) process or mixed system of colored LEDs, typically red, green and blue (RGB).
- D. Provide light source color consistency by utilizing a binning tolerance within a 4 step McAdam ellipse.

## 2.6 EQUIPMENT IDENTIFICATION

- A. Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

- B. Provide labeled luminaires in accordance with UL 1598 requirements. All luminaires must be clearly marked for operation of specific light sources and ballasts or drivers. Note the following light source characteristics in the format "Use Only \_\_\_\_\_".
- C. Correlated color temperature (CCT) and color rendering index (CRI) for all luminaires.
- D. All markings related to light source type must be clear and located to be readily visible to service personnel, but unseen from normal viewing angles when light sources are in place. Drivers must have clear markings indicating multi-level outputs and indicate proper terminals for the various outputs.

## 2.7 POLES

- A. Manufacturers:
  - 1. Section 016000 - Product Requirements: Product substitutions permitted by manufacturers listed in Paragraph 2.1A.
- B. Material and Finish: Aluminum. Finish by the USPS Project Manager.
- C. Section Shape to match existing.
- D. Height: to match existing
- E. Base: Nonbreakaway.
- F. Accessories:
  - 1. Handhole.
  - 2. Anchor bolts.
  - 3. Base cover.
  - 4. Bolt covers.
  - 5. Ground rod and conductor.
- G. Approximate Loading Capacity Ratings:
  - 1. Luminaire Weight: 16 pounds.
  - 2. Luminaire and Bracket Effective Projected Area: 1 square feet.
  - 3. Steady Wind: 90miles per hour minimum, with gust factor of 1.3.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Provide 3000 PSI minimum concrete for lighting poles bases at locations indicated, in accordance with Section 033000 and details shown on drawings.
- B. Install poles plumb. Provide double nuts to adjust plumb. Grout around each base and provide bolt covers.
- C. Bond luminaires, metal accessories and metal poles to branch circuit equipment grounding conductor. Provide supplementary 3/4 inch x 10 foot copper clad rod with #2/AWG/copper grounding electrode conductor at each pole.

### 3.2 FIELD QUALITY CONTROL

- A. Conform to Section 014000: Quality Requirements.
- B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

- C. Measure illumination levels to verify conformance with layout and performance requirements.
- D. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

### 3.3 ADJUSTING

- A. Aim and adjust luminaires to provide illumination levels and distribution as directed.

### 3.4 CLEANING

- A. Conform to Section 017300 -Execution: Cleaning and protecting installed work.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosure, pole, and base.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

### 3.5 PROTECTION OF FINISHED WORK

- A. Conform to Section 017300 – Execution: Protecting installed work.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022

## SECTION 283100

### FIRE EMERGENCY VOICE/ALARM COMMUNICATION SYSTEM (EVACS)

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This specification provides the minimum requirements for the Fire Emergency Voice/Alarm Communication System. The system shall include, but not limited to all equipment, materials, labor, documentation and services necessary to furnish and install a complete, operational system to include but not limited to the following functions:
1. Protected premises fire alarm systems.
  2. Initiating devices.
  3. Notification appliances.
  4. Inspection and testing.
  5. Auxiliary fire alarm equipment.
- B. Related Sections:
1. Section 281304 – Physical Access Control System.
  2. Section 210000 - Fire Suppression.
  3. Section 260500 - Common Work Results for Electrical.
  4. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
  5. Section 260533 – Raceway & Boxes for Electrical Systems.

##### 1.2 REFERENCES

- A. All work and materials shall conform to all applicable federal, state and local codes and regulations governing the installation. If there is a conflict between the referenced standards, federal, state or local codes, and this specification, it is the bidder's responsibility to immediately bring the conflict to the attention of the engineer for resolution. National standards shall prevail unless local codes are more stringent. The equipment and installation shall comply with the current provisions of the following codes and standards.
- B. American National Standards Institute (ANSI):
1. ANSI S3.411, Audible Emergency Evacuation Signals.
  2. ANSI/UL 1971, Standard for Safety Signaling devices for Hearing Impaired.
- C. National Fire Protection Association (NFPA):
1. NFPA 13, Installation of Sprinkler Systems.
  2. NFPA 70, National Electrical Code.
  3. NFPA 72, National Fire Alarm Code.
  4. NFPA 101, Life Safety Code.
  5. NFPA 720, Installation of Carbon Monoxide (CO) detection and Warning Equipment.
- D. Underwriters Laboratories, Inc.(UL):
1. UL 864 - Control Units for Fire Protective Signaling Systems.
  2. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
  3. UL 268A - Smoke Detectors for Duct Applications.
  4. UL 217 - Single and Multiple Station Smoke Alarms.
  5. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
  6. UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.

7. UL 464 - Audible Signaling Appliances.
8. UL 38 - Manually Actuated Signaling Boxes for Use with Fire-Protective Signaling Systems.
9. UL 346 - Waterflow Indicators for Fire Protective Signaling Systems.
10. UL 1711 - Amplifiers for Fire Protective Signaling Systems.
11. UL 1638 - Visual Signaling Appliances.
12. UL 1971 - Signaling Devices for the Hearing-Impaired.
13. UL 1481 - Power Supplies for Fire Protective Signaling Systems.
14. UL 1635 - Digital Alarm Communicator System Units.

NOTE: Control equipment shall be listed to comply with both UL864 and UL2572 standards.

- E. Federal Codes and Regulations
  1. Americans with Disabilities Act (ADA)
- F. International Standards Organization (ISO)
  1. ISO-9000
  2. ISO-9001
- G. Factory Mutual (FM)
  1. Provide factory mutual approval.
- H. ASME 17.1 – Elevator Code
- I. International Code Council
  1. International Building Code
  2. International Fire Code
  3. International Mechanical Code

### 1.3 DEFINITIONS:

- A. Authority Having Jurisdiction (AHJ): See Public Authorities.
- B. Engineer of Record: A Professional Engineer Registered in the State where the project is located who undertakes design of the fire protection system.
- C. Owner: Building/facility owner, landlord/lessor, tenant/lessee, Insurance Carrier or any designated representative of these entities.
- D. Public Authorities: Local, State or Federal government body having jurisdiction over any portion of the project. This includes, but is not limited to: Fire Departments, Fire Marshal Offices, Aviation Authorities, Insurance Regulatory Boards, etc.
- E. Approved: Unless otherwise stated, materials, equipment or submittals approved by the Authority or AHJ.
- F. Circuit: Wire path from a group of devices or appliances to a control panel or transponder.
- G. Central Station: A remote supervising station (facility) that is listed for central station remote monitoring in accordance with NFPA 72. The central station serves as the constantly attended location that receives alarm, supervisory or trouble signals from the protected premises fire alarm system.
- H. CPU: The central computer of a multiplex fire alarm or voice command control system.
- I. EVACS: Dedicated in building “Emergency Voice/Alarm Communication System” utilized for originating and distributing voice instructions and evacuation signals pertaining to a fire emergency to the occupants of a building.

- J. FAAP: Fire Alarm Annunciator Panel.
- K. FACP: Fire Alarm Control Panel.
- L. FM: FM Global (Factory Mutual).
- M. MPSA: Medium Power Speaker Array.
- N. IDC: Initiating Device Circuit.
- O. LCD: Liquid Crystal Display.
- P. NAC: Notification Appliance Circuit.
- Q. NICET: National Institute for Certification in Engineering Technologies.
- R. NRTL: Nationally Recognized Testing Laboratory.
- S. SLC: Signaling Line Circuit.
- T. Style 1: As defined by NFPA 72, Class B.
- U. Style 4: As defined by NFPA 72, Class B.
- V. Style 6: As defined by NFPA 72, Class A.
- W. Style 7: As defined by NFPA 72, Class A.
- X. Style B: As defined in NFPA 72, Class B.
- Y. Style D: As defined in NFPA 72, Class A.
- Z. Style Y: As defined in NFPA 72, Class B.
- AA. UL Listed: Materials or equipment listed and included in the most recent edition of the UL Fire Protection Equipment Directory.
- BB. Zone: Combination of one or more circuits or devices in a defined building area.

#### 1.4 SYSTEM DESCRIPTION

- A. Summary:
  1. Provide all permits, labor, equipment, materials and services to furnish and install a fully tested functional, UL Listed, code compliant, intelligent addressable networked, fire emergency voice/alarm communication system (EVACS) including but not limited to all initiation and notification appliances, all raceways and wiring, and connection to a central station monitoring company.
  2. The fire alarm system supplied under this specification shall utilize modular low voltage design with direct wired, node to node, peer-to-peer network communications. The system shall utilize independently addressed, fire detection devices, input/output control modules, audio amplifiers, and notification appliances as described in this specification. Network panels shall contain the required user interfaces for all functions.
  3. The system shall be designed for interior building audibility of 15 dBA-fast over ambient condition and intelligibility. Intelligibility shall be designed to ensure
  4. All equipment shall be new and the current products of a single manufacturer, actively engaged in the manufacturing and sale of digital fire detection devices for over ten years.

5. Also included are system wiring, fiber optic cable, raceways, pull boxes, terminal cabinets, mounting boxes, and any accessories and miscellaneous items required for a code compliant system.
6. The system drawings show the intended coverage and suggested device locations. Final device quantity, location, and AHJ approval are the responsibility of the contractor.
7. The final system shall be complete, tested, and ready for operation as described elsewhere in this specification, before owner acceptance.
8. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, is compatible with other systems, and will accommodate the future requirements and operations of the building owner. All specified operational features must be met without exception.
9. The Contractor shall furnish all labor, services and materials necessary to furnish and install a complete, functional protected premises fire alarm system (System). The System shall comply in all respects with the requirements of the specifications, manufacturer's recommendations and Underwriters Laboratories Inc. (ULI) listings.
10. Certification that the entire system(s) has/have been inspected and tested, is/are installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations and ULI listings, and is/are in proper working order. Contractor shall use "Fire Alarm System Certification and Description" as required by NFPA 72.

B. Related Work:

1. Work and/or equipment provided in other sections and related to the fire alarm system shall include, but not be limited to:
  - a. Sprinkler water flow, high and low pressure switches and supervisory switches shall be wired and connected by the fire alarm system contractor. Sprinkler devices necessary to accommodate monitoring by the fire alarm system shall be the responsibility of the fire sprinkler system contractor.
  - b. Duct smoke detectors shall be furnished, wired and connected by the electrical contractor.
  - c. Elevator recall control circuits are to be provided in compliance with ANSI A17.1.
  - d. Fire pumps status monitoring.
    - 1) Pump failure (fail to start) indication
    - 2) Pump running indication
    - 3) Phase reversal indication
  - e. Emergency generator status monitoring.
    - 1) Running indication
    - 2) Fail to start indication

C. General:

1. Furnish and install a complete UL list/certified, modular, non-coded, independently point addressable, intelligent Fire Alarm System as described herein and as shown on the plans.
2. System shall be dedicated to fire service.
3. The system shall be fully field programmable such that virtually any combination of system output functions may be correlated to any type of input event(s). Inputs may be combined using Boolean logic, be time dependent or under manual control, as defined by required system operation. Each FACP shall have an operator interface to allow for loading or editing special instructions and system operating sequences as required. The system shall be capable of on-site programming to accommodate and facilitate expansion, building parameter changes and changes as required by local codes. All software operations are to be stored in a non-volatile programmable memory within each of the FACP's. Loss of primary and secondary power shall not erase the system programs stored in memory. There shall be no limit, other than maximum system capacity, as to the number of addressable devices which may be in alarm simultaneously.
4. The FACP's shall allow the operator to set detector sensitivity ratings for each device, within code allowed parameters. To accommodate and facilitate job site changes, initiation circuits shall be individually configurable on site to provide either alarm/trouble operation, alarm only, trouble only, current limited alarm, no alarm, normally closed device monitoring, a non-latching circuit or an alarm verification circuit. All control equipment shall have transient protection devices to comply with UL864 requirements. Addressable smoke detector sensitivity settings for both pre-alarm and



- alarm activation shall be automatically individually configurable for both daytime and nighttime operation. Addressable smoke detectors shall be UL listed for automatic sensitivity testing.
5. Each FACP unit shall accept addressable analog detectors and addressable monitor modules for dry contact devices.
  6. Bypass switches shall be included for system testing to prevent audible/visual signal operation, sprinkler system flow, high and low pressure switch operation, HVAC control activation and remote fire department notification. Bypass switches for fire alarm system testing shall be located in each of the FACP's. Activation of bypass switches shall cause system trouble alarm.
  7. Ease of maintenance shall be facilitated by the use of panel based and PC based system diagnostics.
    - a. The system shall automatically test smoke detector sensitivity, eliminating the need for manual sensitivity testing.
    - b. Ground fault detection and annunciation shall be by individual module address for supervised input and output devices.
    - c. System test operation shall be configurable by individual addressable devices, and not disable entire circuits.
    - d. The system shall be capable of generating a graphical map of connected all addressable devices to aide in circuit troubleshooting.
    - e. Placement supervision of addressable devices shall couple a device's location (not its address) to the programmed system response.
  8. The system shall provide a one-way multi-channel emergency communication sub-system for the distribution of emergency messages to facility occupants.

D. System Components:

1. Provide and install a new fire detection and alarm system that shall consist of:
  - a. Fire Alarm Control Panel.
  - b. LCD remote annunciator(s).
  - c. A system printer.
  - d. Manual pull stations.
  - e. Area smoke detectors.
  - f. Area heat detectors.
  - g. Duct smoke detectors.
  - h. Sprinkler system waterflow(s) and valve supervisory switch(s).
  - i. Interface with suppression, smoke control and ancillary shutdown system(s).
  - j. Audible notification appliances.
  - k. Synchronized visual notification appliances.
  - l. Magnetic door holders.
  - m. Communications.
  - n. Addressable interface devices.
  - o. Digital alarm communicator transmitter.
  - p. Control system integration.
  - q. Provide elevator recall functions for primary and alternate floors and elevator power shunt trip activation.
  - r. Connection to a central station monitoring company. Provide digital alarm communicator transmitter, 3<sup>rd</sup> party digital cellular communicator and remote antenna. The USPS shall arrange for monitoring service contract with a U.L. listed monitoring company. Refer to paragraph 3.6 B.

1.5 SEQUENCE OF OPERATIONS

A. General

1. The alarm activation of any area smoke detector, heat detector, manual pull station, sprinkler waterflow, the following functions shall automatically occur:
  - a. The internal audible device shall sound at the control panel and remote annunciator.

- b. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
  - c. All system activity/events shall be documented in system history and on the system printer.
  - d. Any remote or local annunciator LCD/LED's associated with the alarm shall be illuminated.
  - e. Activate notification audible appliances throughout the building.
  - f. Activate visual strobes notification appliances throughout the building. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed.
  - g. Transmit "Contact ID – Point Address" alarm signals to the central station.
  - h. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
  - i. All exit doors shall unlock throughout the building.
  - j. All self-closing fire/smoke doors held open shall be released.
  - k. Recall elevators to primary or alternate recall floors.
  - l. Upon water flow, the designated mail processing equipment shall immediately shutdown as indicated on the drawings.
- B. Duct Smoke Operation
- 1. The Alarm activation of any duct smoke detector, the following functions shall automatically occur:
    - a. The internal audible device shall sound at the control panel and remote annunciator.
    - b. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
    - c. All system activity/events shall be recorded on the system printer and system history file.
    - d. Any remote or local annunciator LED's associated with the alarm shall be illuminated.
    - e. Transmit "Contact ID – Point Address" alarm signals to the central station.
    - f. Shutdown the local air handling unit.
    - g. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
- C. Elevator Control
- 1. Upon activation of elevator lobby, hoist-way or machine room smoke detector, phase 1 & 2 elevator recall shall be initiated.
  - 2. Upon activation of designated heat detector(s) in elevator hoist-way or machine room, power to the elevator(s) shall be disconnected prior to the application of water. Phase I recall shall meet all requirements of ASME A17.1, 211 3b (5).
- D. Supervisory Operation
- 1. Upon supervisory activation of any sprinkler valve supervisory switch, the following functions shall automatically occur:
    - a. The internal audible device shall sound at the control panel and remote annunciator.
    - b. The LCD display shall indicate all applicable information associated with the supervisory condition including; device type, device location and time/date.
    - c. All system activity/events shall be documented on the system printer and system history file.
    - d. Any remote or local annunciator LCD/LED's associated with the supervisory activation shall be illuminated.
    - e. Transmit "Contact ID – Point Address" supervisory signals to the central station.
- E. Trouble Operation
- 1. Upon activation of a trouble condition or signal from any device on the system, the following functions shall automatically occur:
    - a. The internal audible device shall sound at the control panel and remote annunciator.
    - b. The LCD display shall indicate all applicable information associated with the trouble condition including; device type, device location and time/date.
    - c. All system activity/events shall be documented on the system printer and system history file.

- d. Any remote or local annunciator LCD/LED's associated with the trouble zone shall be illuminated.
- e. Transmit a "Contact ID – Point Address" trouble signal to the central station.

## 1.6 SYSTEM CONFIGURATION

### A. General

- 1. All Life Safety System equipment shall be arranged and programmed to provide a system for the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department (when required), the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants.
- 2. The System shall utilize independently addressed, smoke detectors, heat detectors and input/output modules as described elsewhere in this specification.

### B. Power Supply

- 1. The power supply shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 4.5A continuous for notification appliance circuits. All outputs shall be power limited. The battery shall be sized to support the system for 60 hours of supervisory and trouble signal current plus general alarm for 5 minutes.
- 2. Auxiliary power supplies shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 6.4 continuous for notification appliance circuits. The power supply shall be capable of providing 8A to output circuits for a maximum period of 100 ms. All outputs shall be power limited. The battery shall be sized to support the system for 60 hours of supervisory and trouble signal current plus general alarm for 5 minutes. All supervision of the auxiliary supply shall be transmitted via addressable analog loop without additional equipment.

### C. Display

- 1. The display module shall be of membrane style construction with a 16 line by 40 character Liquid Crystal Display. The LCD shall use super-twist technology and backlighting for high contrast visual clarity. In the normal mode display the time, the total number of active events and the total number of disable points. In the alarm mode display the total number of events and the type of event on display. Reserve 40 characters of display space for user custom messages. The module shall have visual indicators for the following common control functions; AC Power, alarm, supervisory, monitor, trouble, disable, ground fault, CPU fail, and test. There shall be common control keys and visual indicators for; reset, alarm silence, trouble silence, drill, and one custom programmable key/indicator. Provide four pairs of display control keys for selection of event display by type (alarm, supervisory, monitor and trouble) and forward / backward scrolling through event listings. The operation of these keys shall be integrated with the related common control indicator that lights when an event of its type is active. Allow the first event of the highest priority to capture the LCD for display so that arriving fire fighters can view the first alarm event "hands free". Provide system function keys; status, reports, enable, disable, activate, restore, program, and test. The module shall have a numeric keypad, zero through nine with delete and enter keys.
  - a. Basis of Design: Edwards model 3-LCDXL

### D. Initiating Device Circuits

- 1. The Initiating device circuits (IDC) used to monitor manual fire alarm stations, smoke and heat detectors, waterflow switches, valve supervisory switches, fire pump functions, and air pressure supervisory switches shall be Class B.

### E. 24 VDC Notification Appliance Circuits

1. 24 VDC Notification appliance circuits (NAC) shall be Class B. All notification appliance circuits shall have a minimum circuit output rating of 2 amp @ 24 vdc. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.
- F. Audio Notification Appliance Circuits
1. One-way audio notification appliance circuits (NAC) shall be Class B. All notification appliance circuits shall have a minimum circuit output rating of 35W @70Vrms. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.
- G. Signaling Line Circuits (SLC-Data Circuits)
1. The signaling line circuit shall communicate from a panel/node to analog/addressable detectors, input modules, output modules, isolation modules and notification appliance circuits.
  2. Each signaling circuit connected to addressable/analog devices shall provide a minimum of 20 spare addresses.
  3. When a signaling line circuit covers more than one fire/smoke compartments, a wire-to-wire short shall not affect the operation of the circuit from the other fire/smoke compartments.
  4. The signaling line circuit (SLC) connecting all components Class B (style 4).
- H. DACT
1. The panel shall contain a dialer alarm communicator transmitter (DACT) module to transmit all "Contact ID – Point Address" alarm, supervisory and trouble signals to a remote central station monitoring company. The DACT shall support digital 3<sup>rd</sup> party, cellular communications.

## 1.7 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
1. Product Data: For each type of Product required.
  2. It shall be the contractor's responsibility to inspect the job site and become familiar with the conditions under which the work will be performed. These conditions should be used to adjust the submittals.
  3. Shop Drawings: Include plans, elevations, sections, details, and attachments necessary:
    - a. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
    - b. Include voltage drop calculations for notification appliance circuits.
    - c. Include 25 percent spare capacity on each signal circuit so that additional devices can be added.
    - d. Include substantiating emergency (battery) and normal power supply calculations for supervisory and alarm power requirements and calculations of notification device circuit loading (end of circuit voltage drop) to ensure proper operation of all devices.
    - e. 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.
    - f. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits. Drawing scale shall match engineers design drawings.
    - g. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
    - h. Include complete schematic circuit diagrams for system, including all equipment. Wiring diagram shall show point to point connections between all system components
    - i. Include descriptions of system operation, annunciator schedule showing titles for each zone, and manufacturer's literature marked to show model and catalog number for all equipment.
    - j. Include complete riser diagrams for system indicating wiring sequence of all alarm devices and control equipment shall be included with submittal data.

- k. Include requirements of the Integrated Automation, Security, and Clean-Agent System and data sharing details.
- B. General Submittal Requirements:
- 1. Submit for approval four (4) sets of shop drawings and submittal documentation to the consulting engineer for review and comment. Drawing and submittal documentation sets shall be bound. Additional copies may be required at no additional cost to the project.
  - 2. Contained in the title block of each drawing shall be symbol legends with device counts, wire tag legends, circuit schedules for all addressable and notification appliance circuits, the project name/address, and a drawing description which corresponds to that indicated in the drawing index on the coversheet drawing. A section of each drawing title block shall be reserved for revision numbers and notes.
  - 3. 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 minimum.
- C. Construction Drawings:
- 1. The System's Contractor shall prepare fire alarm system installation drawings for permitting in accordance with Florida Administrative Code Rule 61G15. Drawings shall incorporate all required information per Rule 61G15 and be signed and sealed by a registered professional engineer meeting the requirements of Rule 61G15. The System's Contractor furnishing and installing the fire alarm system is responsible for preparation of these drawings and getting drawings approved by the Authority Having Jurisdiction (AHJ).
- D. Systems Contractor Qualifications:
- 1. The contractor directly responsible for this work shall be a systems contractor, who is and who has been regularly engaged in the furnishing and installation of commercial and industrial fire alarm systems of this type and size for at least the immediate past 5 years. All equipment shall be installed by a technician with experience installing the manufactured system or a recognized training school or course for the installations of this type system. The contractor shall, if requested by the engineer; show proof of a specific individual's training. The system's contractor shall directly employ a suitable number of skilled systems installers whose normal work is systems installation and who shall install and make the wire and cable connections thereto.
  - 2. As part of the project submittal, it shall be demonstrated to the satisfaction of the engineer that the systems contractor has adequate plant and equipment to do the work properly and expeditiously, adequate staff and technical experience.
- E. Test Reports: Submit the following reports directly to USPS Project Manager from Manufacturer's Quality Control Inspector, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements:
- 1. Pre-test.
  - 2. Acceptance test.
- F. Certificates: Manufacturer's certificate certifying that components and Products meet or exceed specified requirements.
- G. Qualification Documentation:
- 1. Submit documentation of manufacturer and installer experience indicating compliance with specified qualification requirements. Include lists of completed projects with project names and addresses, and names of Engineers and Owners.
  - 2. Fire alarm contractor license issued by State or local authority having jurisdiction.
- H. Manufacturer's Field Reports: Submit the following reports directly to USPS Project Manager from Manufacturer's Quality Control Inspector, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.
- 1. Preparatory inspection.
  - 2. Initial inspection.

3. Follow-up inspection.
  4. Final inspection.
- I. A copy of the installing technician's NICET certification shall be provided.
- J. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals:
1. Operation and Maintenance Data: Project specific operating manuals covering the installed Life Safety System. A generic or typical owner's instruction and operation manual shall not be acceptable to fulfill this requirement. Include user's software data and recommendations for spare parts to be stocked at the site. Provide names, addresses, and telephone numbers of service organizations that stock repair parts for the system.
  2. Operations and maintenance data for fire-alarm system and components shall include the following:
    - a. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
    - b. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
    - c. Record copy of site-specific software.
    - d. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
      - 1) Frequency of testing of installed components.
      - 2) Frequency of inspection of installed components.
      - 3) Requirements and recommendations related to results of maintenance.
      - 4) Manufacturer's user training manuals.
    - e. Manufacturer's required maintenance related to system warranty requirements.
    - f. Abbreviated operating instructions for mounting at fire-alarm control unit.
    - g. Copy of NFPA 25.
  3. Software and Firmware Operational Documentation:
    - a. Software operating and upgrade manuals.
    - b. Program Software Backup: On magnetic media or compact disk, complete with data files. Provide all required passwords and access to allow independent, factory trained technician working for an authorized partner/dealer to utilize the backup database files.
    - c. Device address list.
    - d. Printout of software application and graphic screens.
  4. Project Record Documents: As-Built drawings consisting of: a scaled plan of each building showing the placement of each individual item of the Life Safety System equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway. All drawings must reflect point to point wiring, device address and programmed characteristics. All drawings shall be provided in AutoCAD format. A hard copy plot of each sheet shall also be provided. Provide the application program listing for the system (to the facility) as installed at the time of acceptance (disk, hard copy printout, and all required passwords).
    - a. The Contractor shall provide three bound copies of the following, to be forwarded to the Owner at completion of project:
      - 1) As-built wiring and conduit layout diagrams showing all fire alarm devices on floor plans, including wire color code and terminal numbers, and showing all interconnections in the system.
      - 2) Electronic circuit diagrams of all FACP modules, power supplies, annunciator, data gathering panels, addressable interface modules, etc.
      - 3) Technical literature on all major parts of the system, including control panels, smoke detectors, batteries, manual stations, alarm notification appliances, power supplies, and remote alarm transmission means.
  5. Record of Completion: Figure 4.5.2.1 NFPA 72.
- K. Maintenance Material Submittals:
1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- a. Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no less than 3 units of each type.
- b. Detector Bases: Quantity equal to 10 percent of amount of each type installed, but no less than 5 units of each type.
- c. Keys and Tools: Four extra sets for access to lock and tamper proofed components.
- d. Audible and Visual Notification Appliances: Five of each type installed.
- e. Manual Pull Stations: Five of each type installed.

## 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm experienced in manufacturing equipment of the types and capacities indicated that have record of successful in-service performance with minimum 10 years documented experience. Prime system manufacturer and manufacturers of major system components required to qualify separately.
  - 1. Service Center: The System Supplier shall maintain a service organization with adequate spare parts stock within 75 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor.
  - 2. System equipment shall be from a single manufacturer and shall be supported by a manufacturer authorized, established service organization that shall stock parts for the equipment supplied.
  - 3. Equipment shall be manufactured by a firm that has been actively manufacturing fire alarm systems for a minimum of 7 years and that offers a 3 year warranty on all control equipment.
  - 4. 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.
  - 5. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.
- B. Installer Qualifications: Experience with systems of the type and scope indicated and certified as authorized service representative of the prime system manufacturer with minimum 5 years documented experience.
  - 1. System shall be installed by a single contractor that assumes responsibility for system components and their compatibility.
  - 2. Only manufacturer's certified installers with NICET Level III or higher shall be utilized.
  - 3. The addressable fire alarm system shall be connected, programmed, and tested only by the manufacturer or by an authorized distributor who stocks a full complement of spare parts for the system. Technicians performing this service shall be trained and individually certified by the manufacturer for the model of system being installed and NICET Level II or greater. Copies of their certifications must be included with the contractor's submittal to the engineer, prior to installation. The submittal cannot be approved without this information.
- C. Regulatory Requirements:
  - 1. Calculations, Product Data, Shop Drawings: Provide stamp of approval from Public Authorities.
  - 2. Comply with requirements of Public Authorities for submittals, approvals, materials, installation, inspections, and testing.
  - 3. Comply with requirements of USPS Project Manager and Owner's insurance underwriter for submittals, approvals, materials, installation, inspections, and testing.
  - 4. Provide certificate of compliance from Public Authorities indicating approval of field acceptance tests.
  - 5. Conform to applicable code for submission of design and calculations, reviewed shop and erection drawings and as required for acquiring permits.
  - 6. Cooperate with regulatory agency or authority and provide data as requested.
- D. Pre-Installation Meetings:
  - 1. Convene a pre-installation meeting one week prior to commencing Work of this Section. Final device and equipment locations shall be coordinated with the Plant and Engineer during this meeting.
  - 2. Require attendance of parties directly affecting Work of this Section.

3. Review conditions of operations, procedures and coordination with related Work.
4. Agenda:
  - a. Tour, inspect, and discuss conditions of building and building structure.
  - b. Review system design and requirements.
  - c. Review required submittals, both completed and yet to be completed.
  - d. Review system Drawings and data.
  - e. Review and finalize construction schedule related to system and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
  - f. Review required inspections, testing, certifying, and material usage accounting procedures.

#### 1.9 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall be responsible for all receiving, handling, and storage of his materials at the job site.
- B. Overnight storage of materials is limited to the assigned storage area. Materials brought to the work area shall be installed the same day, or returned to the assigned storage area unless previously approved by the Owner. Store equipment in a clean, dry space and protect from dirt, fumes, water, construction debris, and physical damage.
- C. The Contractor shall remove rubbish and debris resulting from his work on a daily basis. Rubbish not removed by the Contractor will be removed by the Owner and back-charged to the Contractor.
- D. Handle equipment to prevent internal components damage, breakage, denting, and scoring enclosure and finish.
- E. Do not install damaged equipment.
- F. Do not install or connect any smoke detectors (spot or duct) before areas where detectors are installed are cleaned and ready for occupants as indicated in NFPA-72. If detectors are installed before areas are cleaned, and found to be contaminated at time of final commission or soon after. The installing contractor shall replace detectors with new at no cost to the owner.
- G. After installation, protect from damage by work of other trades.

#### 1.10 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning with Substantial Completion, provide software support for three years.
- C. Upgrade Service:
  1. Update software to latest version at Project completion. Install and program software upgrades that become available within three years from date of Substantial Completion. Upgrading software shall include operating system of the FACP's.
  2. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

#### 1.11 COORDINATION

- A. Coordinate locations of panels, annunciators and equipment with existing field conditions and Plant Staff.



- B. Coordinate conduit and cable runs with other contractors. Include fire proofing and fire stopping at penetrations.
- C. Coordinate locations of devices with reflected ceiling plans and wall elevations.
- D. Pre-installation Conference: Conduct conference at Project site. Conference should discuss all necessary coordination and outline specific interface details to be coordinated with the existing mail processing equipment and access control systems.

#### 1.12 POSITIVE ALARM SEQUENCE

- A. Positive Alarm Sequence: If permitted by the public authority, the fire alarm system shall be equipped with positive alarm sequence feature (per NFPA 72, 9.6.3.4) that allows initial fire alarm signals to be received at the constantly attended control panel location and for which human action is subsequently required to delay the general alarm by 180 seconds after the start of the alarm processing. The transmission of the alarm signal to the central station shall activate upon the initial alarm signal.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. All equipment and components shall be the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approval agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
- B. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  1. Edwards, (800) 655-4497
  2. Siemens, (800) 262-7976.
  3. Honeywell/Notifier, (800) 289-3473.
  4. Simplex/Grinnell, (978) 731-2500
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted subject to approval of USPS Project Manager.
  1. Conflicts, deviations, or change requests shall be submitted in writing to USPS Project Manager with supporting documentation. Include written justification, designs, manufacturer's specifications, cost benefits, and any special circumstances dictated by local conditions. Documentation package shall be submitted in sufficient time to minimize any adverse effects of the proposed changes to the project construction schedule. USPS Project Manager reserves the right to reject substitute and other systems.

#### 2.2 PANEL COMPONENTS AND FUNCTIONS

- A. General
  1. The control panel(s) shall be a multi-processor-based system designed specifically for fire and releasing system applications. The control panel shall be listed and approved for the application standard(s) as listed under the General section.
  2. The control panel(s) shall include all required hardware, software and system programming to provide a complete and operational system. The control panel(s) shall assure that life safety takes precedence among all panel activities.

3. The control panel(s) shall include the following capacities:
  - a. Support up to 2500 analog/addressable points per panel with capacity of networking up to 64 nodes.
  - b. Support up to 5 fully supervised network remote annunciators.
  - c. [Support a DACT (dialer) for off premise cellular notification.]
  - d. Support up to 576 chronological events in history.
4. The control panel(s) shall include the following features:
  - a. Provide auto-programming and electronic addressing and mapping of analog/addressable devices.
  - b. Provide an operator interface display that shall include functions required for annunciation, command and control system functions.
  - c. Provide a discreet system control switch provided for reset, alarm silence, local silence, drill switch, up/down switches, status switch, program switch, enable and disable switches, activate and restore switches, reports switch and test switch.
  - d. Provide system reports that provide sensitivity and history details.
  - e. Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords; and auto-program, enable mapping, restart the system and clear control panel event history file.
  - f. Provide an authorized operator to perform test functions within the installed system.
5. Supervision of system components, wiring, initiating devices and software shall be provided by the control panel(s). Failure or fault of system component or wiring shall be indicated by type and location on the LCD display. Software and processor operation shall be independently monitored for failure.
6. Basis of Design: Control Panel - Edwards, EST3 Series.

B. Annunciation

1. The system shall be designed and equipped to receive, monitor, and annunciate signals from devices and circuits installed throughout the building. Manufacturer's standard control switches shall be acceptable if they provide the required operation, including performance, supervision and position indication. If the manufacturers' standard switches do not comply with these requirements, fabrication of custom manual controls acceptable to the USPS Project Manager is required.
2. Receipt of alarm, trouble, and supervisory signals shall activate integral audible devices at the control panel(s) and at each remote annunciator panel.
3. The control panel(s) and remote annunciator(s) shall contain the following system status indicators:
  - a. 80 character Backlit Liquid Crystal Display.
  - b. System Power Indicator - green LED.
  - c. System Common Alarm - red LED.
  - d. System Common Trouble - yellow LED.
  - e. System Common Supervisory - yellow LED.
  - f. System Common Monitor - yellow LED.
  - g. System Ground Fault - yellow LED.
  - h. System CPU Fault - yellow LED.
  - i. System Disabled - yellow LED.
  - j. System Test Point(s) - yellow LED.
  - k. System Reset Switch with Integral yellow LED.
  - l. System Alarm Silence Switch with Integral yellow LED.
  - m. System Local Silence Switch with Integral yellow LED.
  - n. System Drill Switch with Integral yellow LED
  - o. System Message Queue Scroll Switches.
  - p. Additional buttons as required to provide system control and operator functions.
4. Basis of Design: Edwards EST3 series.

C. Power Supply

1. Each system power supply shall be a minimum of 6 amps @ 24 vdc.

2. Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any alarm, trouble or operator acknowledgment signals.
3. Each system power supply shall be individually annunciated and shall identify the inoperable power supply in the event of a trouble condition.
4. All standby batteries shall be continuously monitored by the system. Low battery and disconnection of battery power supply conditions shall immediately annunciate as a trouble signal, identifying the deficient batteries.
5. All system power supplies shall be capable of recharging their associated batteries, from a fully discharged condition to a capacity sufficient to allow the system to perform consistent with the requirements of this section, in 48 hours maximum.
6. All AC power connections shall be to the building's designated emergency electrical power circuit and shall meet the requirements of Section 4.4.1.4 of NFPA 72. The AC power circuit shall be installed in conduit raceway. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside each control panel.
7. Basis of Design: Edwards model 3-PPS/M2.

#### D. Display

1. System Message Processing and Display Operations:
  - a. The system shall allow message routing to be configured to any or all annunciators.
  - b. All system printer port(s) shall be configurable to output any combination of alarm, supervisory, trouble, or monitor, event messages.
  - c. Each LCD display on each annunciator shall be configurable to display the status of any combination of alarm, supervisory, trouble, or monitor, event messages.
  - d. Clear distinction shall be provided between alarm, supervisory, trouble, and monitor status messages.
2. The system shall provide the ability to retrieve data from the analog/addressable detectors to a PC while the system is on-line and operational in the protected premises. The uploaded data may then be analyzed in a diagnostic program supplied by the system manufacturer.
3. A standby power supply shall automatically supply electrical energy to the system upon primary power supply failure.

#### E. Dialer -- DACT

1. The system shall provide an off premise digital alarm communications transmitter (DACT) capable of transmitting system "Contact ID – Point Address" alarm, trouble and supervisory events to a central station monitoring company. The DACT shall support digital, 3<sup>rd</sup> party, U.L. listed, cellular communications. It shall be possible to delay AC power failure reports, auto test call, and site program the DACT using a touch tone phone and password.
2. Basis of Design:
  - a. Edwards model 3-MODCOM (DACT).
  - b. Honeywell, Telguard, Bosch, DSC (cellular communicator and antenna).

#### F. One-Way Emergency Audio Communications

1. A supervised one-way (8)-channel emergency communications system shall be provided in the main control panel located within the maintenance operation's office. The main one-way audio controller shall provide a push-to-talk microphone with coiled cord, and switches that allow the emergency user to page to the evacuation channel, page to the alert channel or quickly place evacuation or alert tones on the selected channels. Switches shall also be provided to permit paging on the evacuation or alert channel using the firefighters telephone system as the paging source.
2. Each channel shall have the capability to output a different tone or prerecorded message independent of each other. Each supervised branch audio circuit shall provide a connect/disconnect switch and indicators for active circuit selection and circuit trouble.
3. Basis of Design: One-way emergency audio communications module. Edwards model 3-ASU.

#### G. One-Way Emergency Audio Amplifiers

1. The One-Way amplifiers shall be high-efficiency switch-mode audio amplifiers. Each amplifier must support dual channel audio. The audio output shall be configurable as 25VRMS or 70VRMS in Class B wiring, rated at 20,40 or 95 watts. The amplifiers shall support speakers connected directly to the output of the amplifier or the amplifier output shall be capable of being run as an audio riser to switching modules where speaker zone selection is made.
2. Each amplifier shall have a built in back up 1kHz tone generator that automatically activates with loss of input signal. Each amplifier cabinet shall include a backup redundant amplifier. It shall be possible to default to back up tone or standby amplifier in the event of the loss of input signals. System remote amplifiers must communicate their status directly to the main control panel. External monitoring is not acceptable. Onboard status LEDs shall be provided for quick visual indication of amplifier status
3. Basis of Design: Edwards model 3-ZA20, 3-ZA40, 3-ZA95.

#### H. System Printer

1. The event and status printer shall be a 9-pin, impact, dot matrix printer with a minimum print speed of 232 characters per second. The printer shall be capable of serial communications protocol. The printer shall list the time, date, type and user defined message for each event printed.
2. Basis of Design: Edwards model PT-1S.

#### I. Reports

1. The system shall provide the operator with system reports that give detailed chronological description of the last 576 system events. The system shall provide a report that gives a listing of the sensitivity and environmental compensation usage of all of the detectors on the system, or specified analog/addressable circuit.
2. The system report shall also include facility name, compiled date, compiler revision, project revision and report date. The system shall output these reports via the main LCD, and reports shall be capable of being printed on the system printer.

### 2.3 GRAPHIC FIRE COMMAND SERVERS AND WORKSTATIONS

- A. General: The graphic fire command workstation shall Edwards EST FireWorks and be an integral part of the fire command station, and shall function as the common point for operational and administration functions required for the fire alarm system/emergency communication system(s) provided in this specification.
- B. The graphic fire command workstation shall provide multiple points of view of a system event to deliver the user the maximum amount of information with minimum intervention. Complete control of connected FACPs shall be provided.
- C. The graphic fire command workstation shall consist of a primary server (FW-ULS). The graphic command network shall have the capability of supporting a minimum of 15 remote WebClients, and 125 individual EST3 networks with each EST3 network supporting 64 EST3 nodes (ACU/FACPs). The graphic fire command workstation shall support a digital alarm communications receiver (DACR) unit to monitor third-party fire systems using Contact ID format via cellular communications. The workstation shall be UL listed to command and control all FACP networks and equipment supplied under this contract.
- D. The workstation shall be an industrial grade computer listed for UL Standards 864 (Control Units for Fire-Protective Signaling Systems) under categories UOJZ, APOU, and UUKL; UL 1076, (Proprietary Burglar Alarm Units and Systems) under category APOU as applicable. The workstation shall be capable of annunciation and control of all fire detection control points.

- E. The computer shall be a minimum of an Industrial Grade i7 4770S processor 3.9 GHZ, 32 GB RAM, 8 MB Cache, QPI speed of 5 GT/S, 4 core, multi-threaded to 8, RAID solid State Drives, and 2 NICs. .
- F. The computer operating system shall be Windows® 10 Pro 64, Service Pack 1.
- G. There shall be a 22" LCD touch screen main monitor installed as shown on drawing.
- H. Graphic fire command workstation shall be provided with an uninterruptable power source system sized for 4 hours of operation. At a minimum, the system shall provide annunciation and controls for:
  - 1. Activate prerecorded audio messages to any combination of local or remote FACPs.
  - 2. Initiating live page messages to any combination of local or remote FACPs.
  - 3. Controlling/Monitoring local and/or remote building functions as detailed on the functional matrix.
    - a. Fire detection.
    - b. Fire pump status
    - c. Standby generator.
  - 4. Workstation functions shall include but not be limited to:
    - a. Display events in response to an alarm or off normal point. The workstation shall simultaneously display
      - An "Event List Viewport" to display the alarm or off normal point with type and description and time of the event in a prioritized color-coded event list.
      - An "Event Action Viewport" to provide common control capability for Alarm Silence, Panel Silence, Drill and Reset as well as the Event Acknowledge button, the Computer Silence button, and the Event Log.
      - A "Map Viewport" to display a graphical representation of the area/location in which the alarm or off-normal device is located. Device icons shall be surrounded by a color coded boarder that indicates the status of each device.
      - A "Browser Viewport" to automatically access web based emergency information sites,
      - An "Image Viewport" to display a stored image of items relevant to the event highlighted in the event list area. Examples include Hardware identification, Equipment diagrams, etc.
    - b. Highlighting any event in the event list viewport shall automatically cause the viewports to display information relating to the highlighted event. Systems requiring multiple screens to display this information shall not be considered as equal.
    - c. Receipt of incoming events shall transmit event details to web clients.
    - d. Receipt of incoming events shall email event details to responsible parties.
  - 5. Workstation shall be capable of:
    - a. Acknowledging, silencing, and resetting all fire alarm functions.
    - b. Manually activating, deactivating, enabling, and disabling individual fire alarm points.
    - c. Generating status, maintenance and sensitivity reports for all fire alarm components.
    - d. Operating the smoke control system.
  - 6. Workstation shall log all events and operator actions to history for future review.
  - 7. Workstation shall be capable of logging the operator's comments for each event to history with time and date.
  - 8. Workstation shall transmit system status to all connected web clients.

## 2.4 FIELD-MOUNTED SYSTEM COMPONENTS

- A. Smoke Detectors and Accessories
  - 1. Analog Addressable Smoke General
    - a. Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive.
    - b. An alternate alarm sensitivity level shall be provided for each detector, which can be set to any of the five (5) sensitivity settings manually or automatically using a time of day event.
    - c. The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure.

Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance alert signal that 80% to 99% compensation has been used. The detector shall provide a dirty fault signal that 100% compensation has been used.

- d. The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.
2. Smoke Detector - Multi-Sensor Photo Thermal (Ceiling Mounted)
    - a. Provide analog/addressable multisensor combination photoelectric, thermal smoke detectors for all ceiling mounted locations. Alarm condition shall be based upon the combined input from the photoelectric and thermal detection elements. Separately mounted photoelectric detectors and heat detectors in the same location, clustered at the manufacturer's listed spacing is not an acceptable alternative. The system shall have the ability to set the sensitivity and alarm verification of each individual detector on the circuit. It shall be possible to automatically set the sensitivity of individual analog/addressable detectors for the day and night periods.
    - b. Each smoke detector shall be capable of transmitting alarm signals as well as normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient environmental thresholds approximately six times an hour. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value.
    - c. Basis of Design: Edwards model SIGA-PHD.
  3. Smoke Detector - Photoelectric (Duct Mounted)
    - a. Provide analog/addressable photoelectric smoke detectors at all duct applications. The system shall have the ability to set the sensitivity and alarm verification of each of the individual detectors on the circuit. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. Each smoke detector shall be capable of transmitting alarm signals as well as normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient environmental thresholds approximately six times an hour. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value.
    - b. Provide key operated "normal-reset-test" switch at each duct smoke detector.
    - c. Basis of Design: Edwards model SIGA-PD.
  4. Duct Detector Housing
    - a. Provide smoke detector duct housing assemblies to mount an analog/addressable detector along with a standard, relay or isolator detector mounting base. The housing shall also protect the measuring chamber from damage and insects. The housing shall utilize an air exhaust tube and an air sampling inlet tube that extends into the duct air stream up to ten feet. Drilling templates and gaskets to facilitate locating and mounting the housing shall also be provided. The housing shall be finished in baked red enamel. Remote alarm LED indicators and remote test stations shall be provided.
    - b. Basis of Design: Edwards model SIGA-DH.
- B. Heat Detectors
1. Fixed Temperature Heat Detector (Equipment Rooms)
    - a. Provide analog/addressable fixed temperature heat detectors within all equipment rooms. The heat detector shall have a nominal fixed temperature alarm point rating of 135°F

(57°C). The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.

- b. Basis of Design: Edwards model SIGA-HFD.
2. Fixed Temperature-ROR Heat Detector (Ceiling Mounted)
  - a. Provide analog/addressable combination fixed temperature / rate-of-rise detectors for all ceiling mounted locations. The heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a rate of rise alarm point of 15°F (9°C) per minute. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.
  - b. Basis of Design: Edwards model SIGA-HRD.
  - c. Equipment rooms containing permanently installed fuel burning appliances and equipment shall be equipped with analog/addressable, combination, fixed temperature heat and carbon monoxide sensors. Sensors shall be equipped with a sounder base and temporal pattern generator for early detection.
    - 1) Basis of Design: Edwards model SIGA-PHCD with SIGA-AB4GT and SIGA-TCDR.

#### C. Detector Bases

1. Detector Base - Standard
  - a. Provide detector mounting base suitable for mounting on single gang, 3½ or 4 inch octagon box or 4 inch square box. The base shall, contain no electronics and support all series detector types.
  - b. Basis of Design: Edwards model SIGA-SB4.
2. Detector Base - Relay
  - a. Provide relay detector mounting base suitable for mounting on single gang, 3½ or 4 inch octagon box and 4 inch square box. The relay base shall support all detector types and have the following minimal requirements.
  - b. The relay shall be a bi-stable type and selectable for normally open or normally closed operation.
    - 1) The position of the contact shall be supervised.
    - 2) The relay shall automatically de-energize when a detector is removed.
    - 3) The operation of the relay base shall be controlled by its respective detector processor. Detectors operating standalone mode shall operate the relay upon changing to alarm state. Relay bases not controlled by the detector microprocessor shall not be acceptable.
    - 4) Form "C" Relay contacts shall have a minimum rating of 1 amp @ 30 Vdc and be listed for pilot duty.
    - 5) Removal of the respective detector shall not affect communications with other detectors.
  - c. Basis of Design: Edwards model SIGA-RB.

#### D. Manual Stations

1. Manual Station - Double Action Single Stage
  - a. Provide analog/addressable double action, single stage fire alarm stations at the locations shown on the drawings. The fire alarm station shall be of polycarbonate construction and incorporate an internal toggle switch. A locked test feature shall be provided. The station shall be finished in red with silver "PULL IN CASE OF FIRE" lettering. The manual station shall be suitable for mounting on 2 ½ (64mm) deep single gang boxes and 1 ½ (38mm) deep 4 square boxes with single gang covers.
  - b. Provide factory manufactured boxes for all surface mounted applications.
  - c. Basis of Design: Edwards model SIGA-278.

#### E. Notification Appliances

1. General
  - a. All appliances which are supplied for the requirements of this specification shall be UL Listed for Fire Protective Service, and shall be capable of providing the "equivalent facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA(AG)), and shall be UL 1971 Listed.

- b. All appliances shall be of the same manufacturer as the fire alarm control panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturer's instructions.
- c. All notification appliances shall be red unless noted otherwise on the drawings.
- 2. Heavy Duty Horns (Exterior Locations)
  - a. Provide heavy duty electronic horns for exterior locations. Horns shall be selectable for high or low dBA output and steady or temporal output. At the high output setting, the horn shall provide a 85 dBA continuous sound output or a 82 dBA temporal sound output, when measured in reverberation room per UL-464. In and out screw terminals shall be provided for wiring. Weatherproof wall boxes shall be provided for outdoor applications.
  - b. Basis of Design: Edwards Integrity series.
- 3. Low Profile Speaker (Interior Locations)
  - a. Provide low profile wall mount speakers within interior locations. The low profile speaker shall not extend more than 1" (2.5cm) past the finished wall surface, and provide a switch selectable audible output of 2W (90dBA), 1W (87dBA), 1/2W (84dBA), or 1/4W (81dBA) at 10 ft. when measured in reverberation room per UL-464.
  - b. Wattage setting shall be visible with the cover installed. When the cover is installed, no mounting hardware shall be visible. In and out screw terminals shall be provided for all wiring. The low profile speaker shall mount in a 4" x 2 1/8" square electrical box, without trims or extension rings.
  - c. Provide factory manufactured boxes for all surface mounted applications.
  - d. Basis of Design: Edwards Genesis G4 series.
- 4. Speaker-Ceiling Mount-8in
  - a. Provide 8" ceiling mounted speakers at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Speaker baffles shall be round <square> steel with white finish as required. Provide square surface mount boxes with matching finish where required. Speakers shall provide 1/2W, 1W, 2W, and 4W power taps for use with 25V or 70V systems. At the 4 watt setting, the speaker shall provide a 94 dBA sound output a frequency of 1000 Hz. when measured in an anechoic chamber at 10 ft.
  - b. Basis of Design: Edwards Integrity series.
- 5. Low Profile Speaker-Strobe
  - a. Provide low profile wall mount speaker/strobes at the locations shown on the drawings. The low profile speaker/strobe shall not extend more than 1" (2.5cm) past the finished wall surface, and provide a switch selectable audible output of 2W (90dBA), 1W (87dBA), 1/2W (84dBA), or 1/4W (81dBA) at 10 ft. when measured in reverberation room per UL-464.
  - b. Strobes shall provide synchronized flash output that shall be switch selectable for output values of 15cd, 30cd, 75cd & 110cd. Wattage and candela settings shall be visible with the cover installed. When the cover is installed, no mounting hardware shall be visible. In and out screw terminals shall be provided for all wiring. The low profile speaker/strobes shall mount in a 4" x 2 1/8" square electrical box, without trims or extension rings.
  - c. Provide factory manufactured boxes for all surface mounted applications.
  - d. Basis of Design: Edwards Genesis G4 series.
- 6. Speaker-Strobe Ceiling Mount-8in
  - a. Provide 8" ceiling mounted speaker/strobes at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Speaker baffles shall be round or square, steel with white finish as required. Provide square surface mount boxes with matching white finish as required. Speakers shall provide 1/2w, 1w, 2w, and 4W power taps for use with 25V or 70V systems. At the 4 watt setting, the speaker shall provide a 94 dBA sound output a frequency of 1000 Hz. when measured in an anechoic chamber at 10 ft. Strobes shall provide synchronized flash outputs. Strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 75cd, and 110cd devices.
  - b. Basis of Design: Edwards Integrity series.
- 7. Low Profile Strobes
  - a. Provide low profile wall mounted strobes at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Strobes shall provide synchronized flash



outputs. Strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd, or 110cd devices. Low profile strobes shall mount in a single gang box.

- b. Provide factory manufactured boxes for all surface mounted applications.
  - c. Basis of Design: Edwards Genesis series.
  - 8. Strobe Ceiling Mount
    - a. Provide low profile, 7 inch diameter ceiling mounted strobes at the locations shown on the drawings. Devices shall be round and shall not extend more than 1.6 inches past the finished ceiling surface.
    - b. Strobes shall provide synchronized flash outputs. Strobe output shall be from a family of 15cd, 30cd, 75cd, and 110cd devices.
    - c. Low profile ceiling strobes shall mount to a 4 inch square x 2-1/8 inch deep box.
    - d. Basis of Design: Edwards Genesis "GC" series.
  - 9. Speaker-Strobe and Speakers Weatherproof
    - a. Provide low profile, weatherproof, wall mounted speaker-strobes or speakers at the exterior locations shown on the drawings.
    - b. 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 for speaker with clear fire strobe.
    - c. Rated for outdoor use and wall mounted.
    - d. The weatherproof speaker-strobe or speaker shall mount in a factory supplied back box.
    - e. Strobe lights rated light output shall be 15/30/75/110 CD, field selectable and synchronized.
- F. Interior Medium Power Speaker Arrays:
- 1. Provide UL864 interior medium power speaker arrays MPSA at the locations shown on the drawings.
  - 2. Each MPSA site shall include a local control unit, amplifier, standby batteries, charger, power supply, mounting bracket.
    - a. Sound levels at any location where personnel may be located shall be at least 15dBA above ambient but not exceed 120 dBA when measured on the A-scale of a standard sound level meter at slow response.
  - 3. Speakers and control unit
    - a. 650 Watt Omni-directional MPSA Assembly (5 of 5 Active Panels) with lockable cabinet, 250 Watt amplifiers, amplifier terminal panel(s), universal riser supervisory module(s) and 110V/60 Hz. battery backup.
    - b. Provide MPSA amplifier cabinets and components as indicated on the drawings.
  - 4. The MPSA shall be an Edwards MN-HSMP650G70 series.

## 2.5 INITIATION AND CONTROL MODULES

### A. General

- 1. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Modules requiring EPROM, PROM, ROM changes or DIP switch and/or jumper changes shall not be acceptable. The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes which can be retrieved for troubleshooting assistance. Input and output circuit wiring shall be supervised for open and ground faults. The module shall be suitable for operation in the following environment:
  - a. Temperature: 32oF to 120oF (0oC to 49oC)
  - b. Humidity: 0-93% RH, non-condensing

- B. Control Relay Module
1. Provide intelligent control relay modules at the locations shown on the drawings. The Control Relay Module shall provide one form "C" dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. The position of the relay contact shall be confirmed by the system firmware. The control relay module shall be suitable for mounting on 2 ½" (64mm) deep single gang boxes or 1 ½" (38mm) deep 4" square boxes with single gang covers.
  2. Basis of Design: Edwards model SIGA-CR.
- C. Dual Input Module
1. Provide intelligent dual input modules at the locations shown on the drawings. The Dual Input Module shall provide two (2) supervised Class B input circuits each capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on 2 ½" (64mm) deep single gang boxes or 1 ½" (38mm) deep 4" square boxes with single gang covers. The dual input module shall support the following circuit types:
    - a. Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
    - b. Normally-Open Alarm Delayed Latching (Waterflow Switches)
    - c. Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
    - d. Normally-Open Active Latching (Supervisory, Tamper Switches)
  2. Basis of Design: Edwards model SIGA-CT2.
- D. Dual Input Signal Module
1. Provide intelligent dual input signal modules at the locations shown on the drawings. The Dual Input (Dual Riser Select) Signal Module shall provide a means to selectively connect one of two (2) signaling circuit power risers to one (1) supervised output circuit. The module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers. The dual input signal module shall support the following operation:
  2. Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A, 25 Vrms @ 50w or 70 Vrms @ 35w of Audio).
  3. Basis of Design: Edwards model SIGA-CC2.
- E. Isolator Module
1. Provide intelligent fault isolators modules at the locations shown on the drawings. The Isolator Module shall be capable of isolating and removing a fault from a class A data circuit while allowing the remaining data loop to continue operating. The module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers.
  2. Basis of Design: Edwards model SIGA-IM.
- F. Single Input Module
1. Provide intelligent single input modules at the locations shown on the drawings. The Single Input Module shall provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on 2 ½" (64mm) deep 1-gang boxes or 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types:
    - a. Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
    - b. Normally-Open Alarm Delayed Latching (Waterflow Switches)
    - c. Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
    - d. Normally-Open Active Latching (Supervisory, Tamper Switches)
  2. Basis of Design: Edwards model SIGA-CT1.
- G. Single Input Signal Module
1. Provide intelligent single input signal modules at the locations shown on the drawings. The Single Input (Single Riser Select) Signal Module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. When selected as a telephone power selector, the module shall be capable of generating its own "ring tone". The

module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers. The single input signal module shall support the following operations:

- a. Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A, 25Vrms @50w or 70 Vrms @ 35 Watts of Audio)
2. Basis of Design: Edwards model SIGA-CC1.

#### H. Suppression System Releasing Module

1. Provide addressable suppression system releasing interface modules at the locations shown on the drawings. The interface shall be suitable for preaction and deluge sprinkler systems and clean extinguishing agent release. The interface shall provide supervised Class B circuits required for solenoid activation, manual release, system abort, and audible and visible notification of pending release. The interface shall provide all required release and abort timing functions. The interface shall be listed for use with solenoid releasing valves that has both ULI listing and FM approval. The solenoid release circuit shall be provided with a manual disconnect switch for system maintenance.
2. Basis of Design: Edwards model SIGA-REL.

#### I. Universal Class AB Module

1. Provide intelligent class A/B modules at the locations shown on the drawings. The Universal Class A/B Module shall be capable of a minimum of fifteen (15) distinct operations. The module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers. The universal class A/B module shall support the following circuit types:
  - a. Two (2) supervised Class B Normally-Open Alarm Latching.
  - b. Two (2) supervised Class B Normally-Open Alarm Delayed Latching.
  - c. Two (2) supervised Class B Normally-Open Active Non-Latching.
  - d. Two (2) supervised Class B Normally-Open Active Latching.
  - e. One (1) form "C" dry relay contact rated at 2 amps @ 24 Vdc.
  - f. One (1) supervised Class A Normally-Open Alarm Latching.
  - g. One (1) supervised Class A Normally-Open Alarm Delayed Latching.
  - h. One (1) supervised Class A Normally-Open Active Non-Latching.
  - i. One (1) supervised Class A Normally-Open Active Latching.
  - j. One (1) supervised Class A 2-wire Smoke Alarm Non-Verified.
  - k. One (1) supervised Class B 2-wire Smoke Alarm Non-Verified.
  - l. One (1) supervised Class A 2-wire Smoke Alarm Verified
  - m. One (1) supervised Class B 2-wire Smoke Alarm Verified
  - n. One (1) supervised Class A Signal Circuit, 24Vdc @ 2A.
  - o. One (1) supervised Class B Signal Circuit, 24Vdc @ 2A.
2. Basis of Design: Edwards model SIGA-UM.

## 2.6 CONDUCTORS

- A. The requirement of this section apply to all system conductors, including all signaling line, initiating device, notification appliance, auxiliary function, remote signaling, AC and DC power and grounding/shield drain circuits, and any other wiring installed by the Contractor pursuant to the requirements of these Specifications.
- B. All circuits shall be rated power limited in accordance with NEC Article 760.
- C. Installed in conduit or enclosed raceway.
- D. All new system conductors shall be of the type(s) specified herein.
  1. All initiating circuit, signaling line circuit, AC power conductors, shield drain conductors and grounding conductors, shall be solid copper, stranded or bunch tinned (bonded) stranded copper.

2. All signaling line circuits, including all addressable initiating device circuits shall be 18 AWG minimum multi-conductor jacketed twisted cable or twisted shielded or as per manufacturer's requirements.
3. All non-addressable initiating device circuits, 24 VDC auxiliary function circuits shall be 18 AWG minimum or per manufacturer's requirements.
4. All notification appliance circuit conductors shall be solid copper or bunch tinned (bonded) stranded copper. Where stranded conductors are utilized, a maximum of 19 strands shall be permitted for #12/AWG and larger conductors. Minimum size conductor shall be #12 AWG.
5. All audible notification appliance circuits shall be 14 AWG minimum twisted pairs or twisted pairs shielded or per manufacturer's requirements.
6. All visual notification appliance circuits shall be #12 AWG minimum THHN or twisted pairs or twisted shielded pairs or per manufacturer's requirements.
7. Color code fire alarm conductors as follows:

<u>ITEM</u>	<u>COLOR</u>
Initiating Device	Orange/Brown
Speakers	Red
Horn (Exterior)	Blue and Yellow
Flashing Lights	Blue and Yellow
Control Panel Power	Black, White and Green
Air Handler Shutdown	Purple
Door Holders	White

8. All conductors shall be terminated with crimp type, open end, space lugs using tool approved by lug manufacturer. Terminal cabinets shall be provided with screw type terminal strips and plywood backboards.

## 2.7 CONDUCTORS AND RACEWAY

- A. Except as otherwise required by Code and/or these Specifications, the installation of all system circuits shall conform to the requirements of Article 760 and raceway installation to the applicable sections of NFPA 70, National Electrical Code. Fire alarm circuit wiring shall include all circuits described in Section 760.1 including Fine Print Note No. 1 (FPN No. 1), and as defined by the manufacturer's UL listing.
- B. The entire system shall be installed in a skillful manner in accordance with approved manufacturer's installation manuals, shop drawings and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring shall be of the type required by the NEC and approved by local authorities having jurisdiction for the purpose.
- C. Any shorts, opens, or grounds found on new or existing wiring shall be corrected prior to the connection of these wires to any panel component or field device.
- D. The contractor shall neatly tie-wrap all field-wiring conductors in the gutter spaces of the control panels and secure the wiring away from all circuit boards and control equipment components. All field-wiring circuits shall be neatly and legibly labeled in the control panel. No wiring except home runs from life safety system circuits and system power supply circuits shall be permitted in the control panel enclosures. No wiring splices shall be permitted in a control panel enclosure.
- E. All penetration of floor slabs and firewalls shall be fire stopped in accordance with all local fire codes.

## 2.8 CONDUIT RACEWAY

- A. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems maybe installed within a common conduit raceway system, in accordance with the manufacture's recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.
- B. The requirements of this section apply to all system conduits, raceways, electrical enclosures, junction boxes, pull boxes and device back boxes.
- C. All system conduits shall be of the sizes and types specified.
- D. All system conduits shall be EMT, 3/4 -inch minimum, except for flexible metallic conduit used for whips to devices only, maximum length 6 feet, 3/4-inch diameter, minimum.
- E. All system conduits, which are installed in areas, which may be subject to physical damage or weather, shall be IMC or rigid steel, 3/4 -inch minimum.
- F. Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for system conduits shall not exceed 40%.
- G. All fire alarm conduit systems shall be routed and installed to minimize the potential for physical, mechanical or by fire damage, and so as not to interfere with existing building systems, facilities or equipment, and to facilitate service and minimize maintenance.
- H. All conduits, except flexible conduit whips to devices, shall be solidly attached to building structural members, ceiling slabs or permanent walls. Conduits shall not be attached to existing conduit, duct work, cable trays, other ceiling equipment, drop ceiling hangers/grids or partition walls, except where necessary to connect to initiating, notification, or auxiliary function devices.
- I. All system conduits, junction boxes, pull boxes, terminal cabinets, electrical enclosures and device back boxes shall be readily accessible for inspection, testing, service and maintenance.
- J. All electrical junction boxes shall be labeled "Fire Alarm System" with decal or other approved markings and shall be painted "red".

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Examine areas in which Work of this Section is to be performed.
  - 2. Verify that surfaces and site conditions are ready to receive Work.
- C. Report in writing to USPS Project Manager prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

## 3.2 INSTALLATION

### A. General

1. All equipment shall be attached to walls and ceiling/floor assemblies and shall be mounted firmly in place. Detectors shall not be supported solely by suspended ceilings. Fasteners and supports shall be sized to support the required load.

### B. Installation Sequence

1. Installation of the systems shall be conducted in stages and phased such that circuits and equipment are installed in the following order:
  - a. Riser conduits, AC power conduits and control cabinets.
  - b. Control panel(s), control component(s), remote annunciator(s), and printer(s).
  - c. Conduits and wiring for complete notification circuits and appliance installation throughout facility.
  - d. Pre-test the audible and visual notification appliance circuits.
  - e. Install all new detection devices.
  - f. Terminate between field devices and the associated control equipment.
  - g. Complete the interface to all suppression and ancillary shutdown systems.
  - h. Complete contractor pre-test of system.
  - i. Complete system testing

### C. Detectors:

1. A unique identification number shall be assigned to each detector. (Identification shall be by zone number and device number within the zone.) This number shall be noted on the submittals and as built plans, and also be permanently mounted adjacent to the detector or affixed to its base.
2. Smoke- or Heat-Detector Spacing:
  - a. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
  - b. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
  - c. Smooth ceiling spacing shall not exceed 30 feet (9 m).
  - d. 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.
  - e. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.
  - f. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture.
3. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
4. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
5. 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.

D. Install products in accordance with NFPA standards and manufacturer's published instructions.

E. Install manual station with operating handle 44 inches above floor. Install audible and visual signal devices in accordance with NFPA 72 and ANSI/UL 1971.

F. End-of-line resistor device at the last easily accessible mount device or separate box adjacent to last device.

G. Flush mount outlet box for electric door holder to withstand 80 pounds pulling force.

H. Make wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, and all other devices.

- I. Surge suppression shall be provided for all 120 Volt fire alarm equipment and all low voltage wiring exiting or exterior of the facility.

### 3.3 CONNECTIONS

- A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet (1m) 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 elevator recall system and components.
  - 2. Supervisory connections at sprinkler valve supervisory switches.
  - 3. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
  - 4. Supervisory connections at elevator shunt trip breaker.
  - 5. Supervisory connections at fire-pump controllers.
  - 6. Supervisory connections at automatic transfer switch.
  - 7. Supervisory connects at mail processing equipment shutdown relay.

### 3.4 PREPARATION

- A. Coordinate work of this Section with other affected work and construction schedule.

### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Manufacturer's Field Services: Provide services of NICET certified Level III technician to supervise installation, adjustments, final connections, and system testing. Submit written certification on manufacturers letterhead to USPS Project Manager that system has been installed in accordance with applicable codes and is functioning properly. Provide copy of "Certificate of Completion" and place inside plastic envelope at Fire Alarm Control Panel.
- C. Tests and Inspections: The contractor shall perform all testing in occupied facilities at times of day that present the lowest impact and disruption to business and activities. Coordinate all testing in occupied buildings with the building owner's representative to assure that fire alarm system testing does not interrupt operations. This may require extensive after hours work to perform such testing.
- D. Visual Inspection:
  - 1. 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. 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. The systems operation matrix created by the equipment supplier shall be used to identify each alarm input and verify all associated output functions.
- E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

- F. Prepare test and inspection reports.
- G. Advise Plant, Engineer and authorities having jurisdiction in advance of dates and times that tests are to be performed on fire alarm systems.
- H. The system test plan shall include but not be limited to the following:
  - 1. Visually inspect all wiring.
  - 2. Verify the absence of unwanted voltages between circuit conductors and ground. The tests shall be accomplished at the preliminary test with results available at the final acceptance test.
  - 3. System wiring shall be tested to demonstrate correct system response for the following conditions:
    - a. Open, shorted and grounded signal line circuits.
    - b. Open, shorted and grounded notification appliance circuits.
  - 4. System indications shall be demonstrated as follows:
    - a. Correct message content for each alarm input at all system displays.
    - b. Correct annunciator light for each alarm input at each graphic display.
    - c. Correct history logging for all system activity.
    - d. Correct sensitivity for all smoke detection devices. The use of system generated sensitivity reports is acceptable in meeting this requirement.
    - e. Correct signals sent to the Central Monitoring Station.
  - 5. Notification appliances shall be demonstrated as follows:
    - a. All alarm notification appliances actuate as programmed
    - b. The system shall be tested for interior building audibility of 15 dBA-fast over ambient condition.
    - c. MPSA's shall be tested for an outside audibility level of 15 dBA-fast over ambient condition and intelligibility. Intelligibility shall be tested to ensure Common Intelligibility Standard (CIS) rating of 0.7 or Sound Transmission Index of 0.5 in outdoor areas during normal weather conditions. Intelligibility may be less than 0.7 CIS in areas of the zone if it can be determined that a voice signal is being broadcast and an individual could walk less than 164 feet to find a location in the zone with at least 0.7 CIS. Values of 0.65 through 0.74 shall be rounded to 0.7. The mean value of at least 3 readings shall be required to compute the intelligibility score at each test location.
    - d. For 24VDC NACS, measure and record the voltage at the most remote appliance on each notification appliance circuit, while operating.
  - 6. System control functions shall be demonstrated as follows: In accordance with the system operation matrix.
  - 7. System off premises reporting functions shall be demonstrated as follows: Correct information received for each "Contact ID – Point Address" event.
  - 8. Secondary power supply (battery) capacity capabilities shall be demonstrated as follows, if all FACPs and associated booster power supplies are not connected to an emergency power circuit that is supported by an on-site generator:
    - a. System battery voltages and charging currents shall be measured and recorded at the fire alarm control panels.
    - b. System primary power shall be disconnected for 24 hours. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period of 5 minutes.
    - c. System primary power shall be restored for forty-eight (48) hours.
    - d. System battery voltages and charging currents shall again be measured and recorded at the fire alarm control panels.
  - 9. Verify the "As Built" record drawings are accurate.
- I. Preliminary Testing: Conduct preliminary tests to ensure that all devices and circuits are functioning properly. Tests shall meet the requirements of the written test plan. Correct any deficiencies, omissions or anomalies and retest the affected devices to assure proper function per the specification.
- J. Acceptance Testing:



1. A final acceptance test shall not be scheduled until the system manuals are provided to and approved by the owner and the following are provided at the job site:
  - a. (1) "As Built" Record drawings of the system as actually installed
  - b. (2) A copy of the system operation matrix.
2. The acceptance inspector shall use the system "As Built" record drawings in combination with the system operation matrix and the written acceptance test plan during the testing to verify system operation.
3. Should the system not perform to the above criteria it shall not be accepted and the Contractor shall correct all deficiencies and shall re-test the system at Contractor's expense in the presence of the Architect using the same test criteria.
4. The building owner's representative shall witness the final tests.
5. The central station monitoring company and/or fire department shall be notified before final test in accordance with local requirements.
6. Operate every installed device to verify proper operation and correct annunciation at control panel.
7. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify presence of supervision.

K. Test Reports:

1. A "Fire Alarm System Record of Completion" per the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in shall be prepared by the Contractor. Submit three (3) copies to the Architect. The report shall include, but not be limited to:
  - a. A list of all equipment installed and wired.
  - b. Certification that all equipment is properly installed and functions and conforms to these specifications.
  - c. Sensitivity settings for each ionization and photoelectric detector as measured in place with the HVAC system operating.
  - d. Technician's name, certificate number and date.

### 3.6 WARRANTY AND MAINTENANCE

- A. Warranty: The contractor shall warranty all materials, installation and workmanship for 36 months year from date of acceptance, unless otherwise specified. A copy of the manufacturer's warranty shall be provided with close-out documentation and included with the operation and installation manuals. The full cost of maintenance labor and materials required to correct any defect during the warranty period shall be included in the submitted bid.
- B. Remote monitoring: The contractor shall provide the cost of furnishing the 1<sup>st</sup> year of monitoring service from the chosen remote central station monitoring company. The cost of monitoring after the initial first year shall be borne by the USPS.

### 3.7 TRAINING

- A. The System Supplier shall schedule and present a minimum of four (4) hours of documented formalized instruction for the building owner, detailing the proper operation of the installed System.
- B. The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.
- C. The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.

D. Instruction shall be made available to the Local Municipal Fire Department if requested by the AHJ.

END OF SECTION