

Project Manual

## Construction Documents

# Ridgeview Elementary School Renovations

701 Thornton Street  
Liberty, Missouri 64068

Prepared For:

**Liberty School District**

8 Victory Lane

Liberty, Missouri 64068

HM Project No: 23026

Issue Date: November 22, 2023

### **Contents:**

Volume 1: Introductory Information, Bidding and Contracting Requirements,  
Division 2 through Division 12

Volume 2: Division 22 through Division 28



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## **SECTION 000101 - PROJECT TEAM DIRECTORY**

### **PART 1 - GENERAL**

#### **1.1 CONSTRUCTION MANAGER INFORMATION**

- A. Newkirk Novak Construction Partners has been selected as the Construction Manager for this project, and as such, will act as the Owner's representative.
- B. All communication, both written and oral, must be directed through the Construction Manager.

#### **1.2 PROJECT TEAM INFORMATION**

- A. **PROJECT:**
  - 1. Name: 23026 LPS Aging Facilities Ridgeview Elementary
  - 2. Location: 701 Thornton Street, Liberty, Missouri 64068
  - 3. Project No: 23026
- B. **OWNER:**
  - 1. Name: Liberty Public Schools
  - 2. Address: 8 Victory Lane, Liberty, Missouri 64068
  - 3. Contact: Justin Presson
  - 4. Phone: 816.736.5448
- C. **CONSTRUCTION MANAGER:**
  - 1. Name: Newkirk Novak Construction Partners
  - 2. Address: 11200 W. 79th Street, Lenexa, Kansas 66241
  - 3. Contact: Brandon Stanley
  - 4. Email: Brandon.Stanley@newkirknovak.com
  - 5. Phone: 913.312.9535.
- D. **ARCHITECT:**
  - 1. Name: Hollis + Miller Architects, Inc.
  - 2. Address: 1828 Walnut Street, Suite 922, Kansas City, MO 64108.
  - 3. Contact: Nicole Rezai
  - 4. Email: Nrezai@hollisandmiller.com
  - 5. Phone: 816.442.7700 / Fax: 816.599.2545
- E. **STRUCTURAL ENGINEER:**
  - 1. Name: Bob D. Campbell & Co.
  - 2. Address: 4338 Belleview Ave, Kansas City, Missouri 64111.
  - 3. Contact: Wayne Davis
  - 4. Email: wdavis@bdc-engrs.com
  - 5. Phone: 816.531.4114 / Fax: 816.531.8572
- F. **MEP ENGINEER:**
  - 1. Name: Henderson Engineering Inc.
  - 2. Address: 8345 Lenexa Drive, Suite 300, Lenexa, KS 66214
  - 3. Contact: Allen Evans
  - 4. Email: allen.evans@hendersonengineers.com
  - 5. Phone: 913.742.5000

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION (NOT USED)**

### **END OF SECTION**

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**SECTION 000105 - CERTIFICATIONS PAGE**

ARCHITECT

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 1 SECTIONS:	011000, 012100, 012200, 012300, 012500, 013100, 013200, 013233, 013300, 014000, 014200, 014529, 016000, 017310, 017419, 017419, 017700, 017823, 017839, 017900.
DIVISION 2 SECTION:	024119.
DIVISION 6 SECTIONS:	061000, 061600, 064023.
DIVISION 7 SECTIONS:	072500, 076200, 078413, 078446, 079200.
DIVISION 8 SECTIONS:	081113, 081416, 083113, 084113, 085613, 087100, 088000.
DIVISION 9 SECTIONS:	092116, 092900, 093000, 095113, 096513, 096519, 096723, 096813, 099123, 099600.
DIVISION 10 SECTIONS:	101423, 102113, 102123, 102600, 102800.
DIVISION 12 SECTIONS:	123200, 123666.

I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.

KEVIN NELSON

NOVEMBER 22, 2023

ARCHITECT

DATE



NOVEMBER 22, 2023



**SECTION 000105 - CERTIFICATIONS PAGE**

STRUCTURAL ENGINEER

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 3 SECTIONS: 033000

DIVISION 4 SECTIONS: 042200

DIVISION 5 SECTIONS: 051200, 053100, 054000

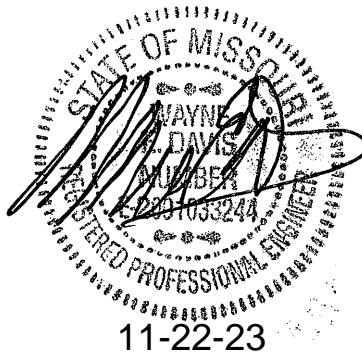
I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.

WAYNE E. DAVIS

11/22/2023

STRUCTURAL ENGINEER

DATE





**DOCUMENT 000105 – CERTIFICATIONS AND SEALS**

Engineer:

I hereby state, that the Specifications intended to be authenticated by my seal are limited to Specification Sections listed below:

Division 26 Sections: 260000, 260010, 260500, 260502, 250504, 250510, 260519, 260526, 250529, 260533,  
260553, 260913, 262416, 262726, 262813, 262816, 265100  
Division 28 Sections: 280010, 280501, 281000, 281010, 281300

I hereby disclaim any responsibility for all other specifications, drawings estimates, reports, or other documents or instruments relating to or intended to be used for any part or parts of the architectural or engineering project or survey.

\_\_\_\_\_  
Engineer

\_\_\_\_\_  
Date



11/10/2023



**DOCUMENT 000105 – CERTIFICATIONS AND SEALS**

Engineer:

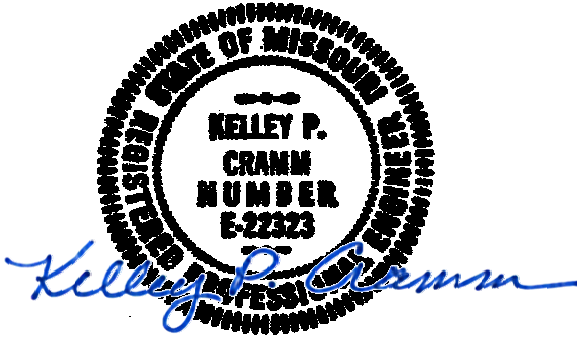
I hereby state, that the Specifications intended to be authenticated by my seal are limited to Specification Sections listed below:

Division 22 Sections: 220010, 220010, 220015, 220500, 220515, 220523, 220529, 220553, 220700, 221100, 221111, 221300, 224000, 227000, 227010  
Division 23 Sections: 230010, 230015, 230500, 230513, 230514, 230519, 230523, 230529, 230550, 230553, 230593, 230700, 230913, 230923, 232113, 232114, 232123, 233113, 233300, 233423, 233713, 237313, 237433, 238200

I hereby disclaim any responsibility for all other specifications, drawings estimates, reports, or other documents or instruments relating to or intended to be used for any part or parts of the architectural or engineering project or survey.

\_\_\_\_\_  
Engineer

\_\_\_\_\_  
Date



11/10/2023



**DOCUMENT 000105 – CERTIFICATIONS AND SEALS**

Engineer:

I hereby state, that the Specifications intended to be authenticated by my seal are limited to Specification Sections listed below:

Division 28 Sections: 284600

I hereby disclaim any responsibility for all other specifications, drawings estimates, reports, or other documents or instruments relating to or intended to be used for any part or parts of the architectural or engineering project or survey.

\_\_\_\_\_  
Engineer

\_\_\_\_\_  
Date



11/20/2023



## DOCUMENT 000110 – TABLE OF CONTENTS

Project Name: Ridgeview Elementary School Renovations  
Project No.: 23026  
Site Address: 701 Thornton Street, Liberty, Missouri 64068  
City, State Zip: Liberty, Missouri 64068

Revisions	Date

Latest Revision Original Issue

### INTRODUCTORY INFORMATION

000101	Project Team Directory	11.22.2023
000105	Certifications and Seals	11.22.2023
000110	Table of Contents	11.22.2023

### BIDDING REQUIREMENTS

(Refer to Construction Manager's Front End Manual for additional Bidding Requirements)

### DIVISION 1 – GENERAL REQUIREMENTS

011000	Summary	11.22.2023
012100	Allowances	11.22.2023
012200	Unit Prices	11.22.2023
012300	Alternates	11.22.2023
012500.1	Substitution Procedures	11.22.2023
012500.2	Substitution Procedures Form	11.22.2023
013100	Project Management and Coordination	11.22.2023
013200	Construction Progress Documentation	11.22.2023
013233	Photographic Documentation	11.22.2023
013300	Submittal Procedures	11.22.2023
014000	Quality Requirements	11.22.2023
014200	References	11.22.2023
014529	Testing and Inspections	11.22.2023
016000	Product Requirements	11.22.2023
017310	Cutting and Patching	11.22.2023
017419	Construction Waste Management and Disposal	11.22.2023
017700	Closeout Procedures	11.22.2023
017823	Operation and Maintenance Data	11.22.2023
017839	Project Record Documents	11.22.2023
017900	Demonstration and Training	11.22.2023

### DIVISION 2 – EXISTING CONDITIONS

024119	Selective Demolition	11.22.2023
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### DIVISION 3 – CONCRETE

033000	Cast-in-Place Concrete	11.22.2023
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### DIVISION 4 - MASONRY

042200	Concrete Unit Masonry	11.22.2023
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### DIVISION 5 - METALS

051200	Structural Steel Framing	11.22.2023
053100	Steel Decking	11.22.2023
054000	Cold-Formed Metal Framing	11.22.2023

**DIVISION 6 – WOOD AND PLASTICS**

061000	Rough Carpentry	11.22.2023
061600	Sheathing	11.22.2023
064023	Interior Architectural Woodwork	11.22.2023

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

072500	Weather Barriers	11.22.2023
076200	Sheet Metal Flashing and Trim	11.22.2023
078413	Penetration Firestopping	11.22.2023
078446	Fire Resistive Joint Systems	11.22.2023
079200	Joint Sealants	11.22.2023

**DIVISION 8 - DOORS AND WINDOWS**

081113	Hollow Metal Doors and Frames	11.22.2023
081416	Flush Wood Doors	11.22.2023
083113	Access Doors and Frames	11.22.2023
084113	Aluminum Framed Entrances and Storefronts	11.22.2023
085613	Transom Windows	11.22.2023
087100	Door Hardware	11.22.2023
088000	Glazing	11.22.2023

**DIVISION 9 - FINISHES**

092116	Non-Structural Metal Framing	11.22.2023
092900	Gypsum Board	11.22.2023
093000	Tiling	11.22.2023
095113	Acoustical Panel Ceilings	11.22.2023
096513	Resilient Base and Accessories	11.22.2023
096519	Resilient Tile Flooring	11.22.2023
096723	Resinous Flooring	11.22.2023
096813	Tile Carpeting	11.22.2023
099123	Interior Painting	11.22.2023
099600	High-Performance Coatings	11.22.2023

**DIVISION 10 – SPECIALTIES**

101423	ADA and Code Signage	11.22.2023
102113	Toilet Compartments	11.22.2023
102123	Cubicle Curtains and Track	11.22.2023
102600	Wall and Door Protection	11.22.2023
102800	Toilet, Bath & Laundry Accessories	11.22.2023

**DIVISION 12 - FURNISHINGS**

123200	Manufactured Wood Casework	11.22.2023
123666	Solid Surfacing Countertops	11.22.2023

**DIVISION 22 - PLUMBING**

220010	General Plumbing Requirements	11.22.2023
220015	Coordination	11.22.2023
220500	Common Work Results for Plumbing	11.22.2023
220515	Basic Piping Materials and Methods	11.22.2023
220523	General Duty Valves for Plumbing Piping	11.22.2023
220529	Hangers and Supports for Plumbing Piping	11.22.2023
220553	Identification for Plumbing Piping and Equipment	11.22.2023
220700	Plumbing Insulation	11.22.2023

		Latest Revision	Original Issue
221100	Water Distribution Piping and Specialties		11.22.2023
221111	Mechanically Joined Plumbing Piping Systems		11.22.2023
221300	Sanitary Drainage and Vent Piping Specialties		11.22.2023
224000	Plumbing Fixtures		11.22.2023
227000	Natural Gas Systems		11.22.2023
227010	Mechanically Joined Natural Gas Piping Systems		11.22.2023

#### DIVISION 23 - HEATING, VENTILATING AND AIR CONDITIONING

230010	General Mechanical Requirements		11.22.2023
230015	Electrical Coordination for Mechanical Equipment		11.22.2023
230500	Common Work Results for HVAC		11.22.2023
230510	Basic Piping Materials and Methods		11.22.2023
230513	Common Motor Requirements for HVAC Equipment		11.22.2023
230514	Variable Frequency Drives		11.22.2023
230519	Meters and Gages for HVAC Piping		11.22.2023
230523	General Duty Valves for HVAC Piping		11.22.2023
230529	Hangers and Supports for HVAC Piping and Equipment		11.22.2023
230550	Vibration Isolation for HVAC		11.22.2023
230553	Identification for HVAC Piping and Equipment		11.22.2023
230593	Testing, Adjusting, and Balancing for HVAC		11.22.2023
230700	HVAC Insulation		11.22.2023
230913	Instrumentation and Control Devices for HVAC		11.22.2023
230923	Direct Digital Control (DDC) System for HVAC		11.22.2023
232113	Hydronic Piping		11.22.2023
232114	Hydronic Specialties		11.22.2023
232123	Hydronic Pumps		11.22.2023
233113	Metal Ducts		11.22.2023
233300	Air Duct Accessories		11.22.2023
233423	HVAC Power Ventilators		11.22.2023
233713	Diffusers, Registers, and Grilles		11.22.2023
237313	Central-Station Air Handling Units		11.22.2023
237433	Dedicated Outdoor-Air Units		11.22.2023
238200	Terminal Heating & Cooling		11.22.2023

#### DIVISION 26 - ELECTRICAL

260010	General Electrical Requirements		11.22.2023
260500	Common Work Results for Electrical		11.22.2023
260502	Equipment Wiring Systems		11.22.2023
260504	Provisions for Electrical Utility Service		11.22.2023
260519	Low-Voltage Electrical Power Conductors and Cables		11.22.2023
260526	Grounding and Bonding for Electrical Systems		11.22.2023
260529	Hangers and Supports for Electrical Systems		11.22.2023
260533	Raceway and Boxes for Electrical Systems		11.22.2023
260923	Lighting Control Devices		11.22.2023
262416	Panelboards		11.22.2023
262726	Wiring Devices		11.22.2023
262813	Fuses		11.22.2023
262816	Enclosed Switches and Circuit Breakers		11.22.2023
265100	Interior Lighting		11.22.2023

#### DIVISION 27 – COMMUNICATIONS

270010	General Communications Requirements		11.22.2023
270500	Common Work Results for Communications		11.22.2023

		Latest Revision	Original Issue
271000	Structured Cabling System		11.22.2023
271100	Telecommunications Equipment Room Fittings		11.22.2023
271500	Communications Horizontal Cabling		11.22.2023
274100	Audio Video Systems		11.22.2023

#### DIVISION 28 - ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION

280010	General Electronic Safety and Security Requirements		11.22.2023
280501	Common Work Results for Electronic Security		11.22.2023
281000	Electronic Security Systems		11.22.2023
281010	Conductors and Cables for Electronic Security		11.22.2023
281300	Access Control Software and Database Management		11.22.2023
284600	Fire Detection and Alarm		11.22.2023

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## SECTION 011000 - SUMMARY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Work by Owner.
  - 4. Work under separate contracts.
  - 5. Future work.
  - 6. Access to site.
  - 7. Coordination with occupants.
  - 8. Work restrictions.
  - 9. Specification and drawing conventions.
  - 10. Miscellaneous provisions.
- B. Related Requirements:
  - 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### 1.2 PROJECT INFORMATION

- A. Project Identification: 23026 LPS Aging Facilities Ridgeview Elementary
  - 1. Project Address: 701 Thornton Street, Liberty, Missouri 64068 .
- B. Owner: **Liberty Public Schools**
  - 1. Refer to Document 000101 "Project Team Directory."
- C. Architect:
  - 1. Refer to Document 000101 "Project Team Directory."
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
  - 1. Refer to Document 000101 "Project Team Directory."
- E. Construction Manager:
  - 1. Refer to Document 000101 "Project Team Directory."
  - 2. Construction Manager has been engaged for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for Construction between Owner and each Contractor, according to a separate contract between Owner and Construction Manager.

#### 1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
  - 1. General: All demolition, sitework, architectural, structural, fire suppression, plumbing, mechanical, electrical, access control, technology and utilities as indicated in the Contract Documents and as further defined in the Scopes of Work.
  - 2. Alternates: Refer to Section 012300 "Alternates".
- B. Type of Contract:
  - 1. Project will be constructed under a multiple trade contract.

#### 1.4 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

#### 1.5 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

#### 1.6 FUTURE WORK

- A. The Contract Documents include requirements that will allow the Owner to carry out future work following completion of this portion of the Project.

#### 1.7 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Limits: Confine construction operations to areas indicated and as directed by Construction Manager.
  - 2. Driveways, Walkways, and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Restrictions: Note that no deliveries to the Project Site will be allowed between the hours of 7:00 am to 8:30 am and 2:00 pm to 3:30 pm.
    - b. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - c. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

#### 1.8 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
  - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

#### 1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 4:00 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: Coordinate and schedule all weekend hours with the Owner not less than 48 hours in advance. Comply with regulations of authorities having jurisdiction.
  2. Early Morning Hours: Notify Owner of days when early morning hours will be required and comply with regulations of authorities having jurisdiction.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Architect and Owner not less than three (3) days in advance of proposed utility interruptions.
  2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Architect and Owner not less than three (3) days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Nonsmoking Buildings and Sites: Smoking is not permitted on School District property.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.
  2. As a condition for the award of any service contract in excess of \$5,000.00 by the Owner, the service provider must be enrolled in and currently participating in "E-Verify" or any other equivalent electronic verification of work authorization program operated by the U.S. Department of Homeland Security.
  3. As a further condition for the award of any service contract in excess of \$5,000.00 the service provider shall not knowingly employ any person who is an un-authorized alien in conjunction with the contracted services.
    - a. E-Verify forms are available for duplication and contractor's use in Section 008400 – Attachments.

#### 1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
  3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION (NOT USED)

#### END OF SECTION

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## **SECTION 012100 - ALLOWANCES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
- C. Related Requirements:
  - 1. Section 012200 "Unit Prices" for procedures for using unit prices.
  - 2. Section 014000 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

#### **1.2 SELECTION AND PURCHASE**

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

#### **1.3 ACTION SUBMITTALS**

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### **1.5 COORDINATION**

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

#### **1.6 LUMP-SUM AND UNIT-COST ALLOWANCES**

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

1. Sales and Use Taxes shall be omitted for this project.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner and/or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  1. If requested by Architect, retain, and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.
- D. Refer to "Bid Packages" for further clarification of required allowances.

#### 1.7 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  1. Include installation costs in purchase amount only where indicated as part of the allowance.
  2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
  3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
  4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION

##### 3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

##### 3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

##### 3.3 SCHEDULE OF ALLOWANCES

- A. General: Refer to individual Bid Package – Scopes of Work for Allowances.

#### END OF SECTION

## **SECTION 012200 - UNIT PRICES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
  - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
  - 2. Section 014000 "Quality Requirements" for general testing and inspecting requirements.

#### **1.2 DEFINITIONS**

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or 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, applicable taxes (other than sales and use tax), overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner 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 Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### **3.1 SCHEDULE OF UNIT PRICES**

- A. Refer to Individual Bid Package – Scopes of Work.

**END OF SECTION**

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## SECTION 012300 - ALTERNATES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

#### 1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

#### 1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

### PART 2 PRODUCTS (NOT USED)

### PART 3 EXECUTION

#### 3.1 SCHEDULE OF ALTERNATES

- A. Alternate No.1: Ceiling and Grid Replacement
  - 1. Alternate: Alternate includes all labor, materials, equipment, and appurtenances necessary to replace ceiling tile and grid in all areas of work as indicated on Drawings as Alternate No. 1.
  - 2. Base Bid: Replace ceiling tiles and grid as required for MEP work above ceiling as indicated on Drawings.

END OF SECTION

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**SECTION 012500.01 - SUBSTITUTION PROCEDURES FORM**

**PROJECT:** LPS Ridgeview Elementary Renovations, 701 Thornton Street, Liberty, Missouri 64048

**MAIL TO:** HOLLIS + MILLER ARCHITECTS, 1828 WALNUT STREET, SUITE 922, KANSAS CITY, MISSOURI 64108

**SPECIFIED ITEM/ KEYNOTE #:** \_\_\_\_\_

**PROPOSED SUBSTITUTE:** \_\_\_\_\_

**SUBMITTED BY:** \_\_\_\_\_

**FIRM:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**PHONE NUMBER:** \_\_\_\_\_

ATTACH COMPLETE DESCRIPTION, DESIGNATION, CATALOG OR MODEL NUMBER, SPEC DATA SHEET AND OTHER TECHNICAL DATA AND SAMPLES, INCLUDING LABORATORY TESTS IF APPLICABLE.

*FILL IN BLANKS BELOW:*

1. WILL SUBSTITUTION AFFECT DIMENSION INDICATED ON DRAWINGS?
2. WILL SUBSTITUTION AFFECT WIRING, PIPING, DUCTWORK, ETC., INDICATED ON DRAWINGS?
3. WHAT EFFECT WILL SUBSTITUTION HAVE ON OTHER TRADES?
4. DIFFERENCES BETWEEN PROPOSED SUBSTITUTION AND SPECIFIED ITEM?
5. ANY AND ALL IMPACTS ON COSTS, DESIGN MODIFICATIONS, ADDITIONAL ARCHITECTURAL AND ENGINEERING SERVICES, MATERIAL AND LABOR CHANGES, SCHEDULE CHANGES, AND OTHER UNANTICIPATED CONSEQUENCES, RESULTING FROM THIS SUBSTITUTION IN LIEU OF THE SPECIFIED ITEM, SHALL BE THE FULL

RESPONSIBILITY OF THE CONTRACTOR AND HIS SUBCONTRACTORS AND SUPPLIER.

6. MANUFACTURER'S WARRANTIES OF THE SPECIFIED ITEMS AND PROPOSED ITEMS ARE: ☐ SAME OR  
☐ DIFFERENT, *EXPLAIN:* \_\_\_\_\_

**REVIEW COMMENTS:**

☐ **NO EXCEPTION TAKEN TO SUBMITTED MANUFACTURER**

*MANUFACTURER ONLY, IS ACCEPTED DUE TO TIME LIMITATIONS FOR FULL REVIEW OF PRODUCT, OR  
BECAUSE NO SPECIFIC PRODUCT DATA IS SUBMITTED, OR OTHER UNSPECIFIED REASONS. CONTRACTOR  
MUST STILL BEAR FULL RESPONSIBILITY FOR COMPLIANCE WITH CONTRACT REQUIREMENTS.*

☐ **NO EXCEPTION TAKEN TO SPECIFIC PRODUCTS**

☐ **EXCEPTIONS NOTED**

*SEE ATTACHED COPY OR NOTES ON PRODUCT LITERATURE*

☐ **NOT ACCEPTED**

☐ **RECEIVED TOO LATE**

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

REMARKS: \_\_\_\_\_

END OF SECTION

## **SECTION 012500 - SUBSTITUTION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for "Substitutions for Convenience" and "Substitutions for Cause".
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for products selected under an allowance.
  - 2. Section 012200 "Unit Prices" for products selected under a unit price.
  - 3. Section 012300 "Alternates" for products selected under an alternate.
  - 4. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
  - 5. Division 02 through 33 Sections for specific requirements and limitations for substitutions.

#### **1.2 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms. Substitutions for Cause shall be submitted after award of the contract as set forth hereinafter.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner. Substitutions for Convenience shall be submitted prior to bidding as set forth hereinafter.
- B. Comparable Products: Naming of specified items on the Drawings and in the specifications, means that such named items are specifically required by the Architect and/or Owner. When the words "or comparable product" follows such named item(s), a substitution request must be submitted when proposing a product other than the named product. Requests for substitutions must be received by the Architect within the time frame set hereinafter.
- C. The following are not considered substitutions:
  - 1. Revisions to Contract Documents requested by the Owner or Architect.
  - 2. Specified options of products, materials and construction methods included in the Contract Documents.

#### **1.3 ACTION SUBMITTALS**

- A. Substitution Requests: Submit at least one (1) paper copy or an electronic pdf copy of each request for consideration to the Architect. Clearly Identify proposed product and related options or fabrication or installation method to be replaced. Include Specification Section number and title, in addition to applicable Drawing numbers and titles.
  - 1. Substitution Request Form: Use facsimile of form provided at the end of this Section.
    - a. Accompanying each Substitution Request shall be a fully executed copy of the Substitution Request Form.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Specifically indicate deviations, if any, from the Work specified in writing.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested, of proposed substitution and of specified product shall be submitted for comparison and review by Architect.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects with project names and addresses and names, addresses and contact information of architects and owners.
  - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Review Process: Submittal requests for proposed substitutions will be processed using the following procedures:
- a. Submittals will be "Received Dated" immediately upon arrival.
  - b. Submittals will be placed by receiving person in a file designated for that purpose.
  - c. Submittals will not be reviewed for completeness or compliance until after the date and time established for closing of receipt of substitution request submittals.
  - d. Submittals will be reviewed by a member of Hollis + Miller Architect's staff (or respective consultant). Reviewer(s) will not be designated until after closing period established for receipt of submittals.
  - e. Reviewer's General Attitude will be:
    - 1) Burden of Proof is on Proposer.
    - 2) Reviewer should not be required to complete the submittal, that is, select from options or between models and lines of products.
    - 3) Reviewer should not be required to conduct an exhaustive review of the submittal. Submittals of manufacturer's catalogs which do not clearly indicate proposed product and proposed product options will be rejected.
    - 4) Reviewer should not be required to seek information from manufacturer's literature on file in the office, from an improperly submitted electronic submittal or information in other locations.
    - 5) Substitute must be "comparable to" or superior in those features and performance which the Project requires and those which the specified product will provide.
    - 6) Review is complete when, in the reviewer's opinion, significant deficiency(ies) are established. In such case, review of data covering other points of specifications is not required.
  - f. Reviewer will note action taken (No Exception taken to Submitted Manufacturer, No Exception taken to Specific Product, Exceptions Noted, Not Accepted or Received Late), the date, and his/her initials.
  - g. All submittals received after closing time will be "Received Dated", marked "Late", initialed by reviewer, and filed without review.
  - h. Submittals will be filed in Architect's office until completion of the Project.
4. Architect's Action:
- a. Architect will review requests for "Substitutions for Convenience" only once, no additional information may be submitted. Architect may request additional information as necessary for review of "Substitutions for Cause."
  - b. Architect will note action taken.
  - c. Architect is not obligated nor required to review any and all substitution requests.
  - d. Architect is not obligated to inform proposers of substitutions of incomplete and non-accepted requests for substitution.
  - e. Acceptance of Substitutions:
    - 1) Acceptance of Substitutions for Convenience: Accepted substitutions will be set forth in an Addendum and in no other manner.
      - (a) Use product specified if Architect does not issue a decision on use of a proposed substitution.
    - 2) Acceptance of Substitutions for Cause: Architect will review proposed substitution within 15 business days of receipt of request. If necessary, Architect, through Construction Manager, will request additional information or documentation for evaluation within seven (7) business days of

receipt of a request for Substitution for Cause.” Architect will notify Contractor through Construction Manager of acceptance of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

**Only acceptable substitutions will receive notification of status. Substitutions shall be considered unacceptable unless a form of acceptance is received by the Proposer.**

- (a) Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
- (b) Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### 1.4 ELECTRONIC SUBMITTAL OF SUBSTITUTIONS

- A. Substitution Request submittals will be accepted for review when submitted electronically under the following conditions. Substitution requests which are not submitted in accordance with the criteria listed below may be rejected at the Architect's discretion.
  - 1. Accompanying each submittal shall be a fully executed copy of the Substitution Request Form.
  - 2. Submittals shall be sent to Hollis + Miller Architects, to the attention of the contact listed in Document 000101 "Project Team Directory. Submittals directed to the attention of anyone other than the contact listed will not be considered.
  - 3. Submittals of Substitutions for Cause must be received within the time limits set forth in Paragraph 2.1 A of this Section.
  - 4. Submittals of Substitutions for Convenience must be received prior to bidding and within the time limits set forth in Paragraph 2.1 B of this Section.
  - 5. Documentation requirements as set forth in 1.3 A.2a through 1.3 A.2m are applicable to electronic submittals.
    - a. Note: Electronic submittals in which the manufacturer's entire catalog is submitted will be rejected.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

#### 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions at no additional cost to the Owner.

### PART 2 - PRODUCTS

#### 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than thirty (30) days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Architect and Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Request is directly related to a "or comparable product" clause or similar language in the Contract Documents.
    - c. Specified product or method of construction cannot be provided within the Contract Time.
    - d. Specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
    - e. Specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution will provide the specified warranty.
    - f. Substitution request is fully documented and properly submitted.

- g. Requested substitution will not adversely affect Contractor's construction schedule.
  - h. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - i. Requested substitution is compatible with other portions of the Work.
  - j. Requested substitution has been coordinated with other portions of the Work.
  - k. Requested substitution provides specified warranty.
  - l. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution only when submitted prior to bidding, and no later than 4:00 p.m. (local time) eight (8) calendar days prior to the date established for receipt of bids. Requests received after that time may be considered or rejected at discretion of Architect.
- 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - b. Requested substitution does not require extensive revisions to the Contract Documents.
    - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - d. Substitution request is fully documented and properly submitted.
    - e. Requested substitution will not adversely affect Contractor's construction schedule.
    - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - g. Requested substitution is compatible with other portions of the Work.
    - h. Requested substitution has been coordinated with other portions of the Work.
    - i. Requested substitution provides specified warranty.
    - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- C. The Contractor's submittal and A/E's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptance or validate request for substitution, nor does it constitute approval.
- D. Under no circumstances does the Architect's and/or Owner's acceptance of any such substitution relieve the Contractor from timely, full and proper performance of the Work.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## **SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. Requests for Information (RFIs).
  - 4. On-line Project file.
  - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
  - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

#### **1.2 DEFINITIONS**

- A. RFI: Request from Owner, Construction Manager, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use form acceptable to Construction Manager. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within ten (10) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project. Keep list current at all times.
  - 1. Post paper copies of list in project meeting room, in temporary field office, and by each temporary telephone.
  - 2. Post electronic copy as PDF electronic files directly to Project file on the JE Dunn Submittal Portal website (<https://submittals.jedunn.com>) specifically established for Project.

#### **1.4 GENERAL COORDINATION PROCEDURES**

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
  2. Preparation of the schedule of values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Preinstallation conferences.
  7. Project closeout activities.
  8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Refer to Section 017419 "Construction Waste Management and Disposal" for additional requirements.

## 1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - f. Indicate required installation sequences.
    - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
  3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.

5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  6. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    - c. Fire-rated enclosures around ductwork.
  7. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
  8. Fire-Protection System: Show the following:
    - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
  9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
  10. Coordination Drawing Prints: As deemed necessary by Construction Manager, prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
  3. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
    - a. Refer to individual Scopes of Work for Trades required to perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
  4. Architect, through Construction Manager, will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
    - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    - b. Digital Drawing Software Program: The Contract Drawings are available in Revit version 2023 using Windows 11 operating system.
    - c. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.

## 1.6 REQUESTS FOR INFORMATION (RFIS)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. Name of Construction Manager.
  7. RFI number, numbered sequentially.
  8. RFI subject.
  9. Specification Section number and title and related paragraphs, as appropriate.
  10. Drawing number and detail references, as appropriate.

11. Field dimensions and conditions, as appropriate.
  12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  13. Contractor's signature.
  14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or a software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect or Construction Manager after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly in form acceptable to Architect. Include the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. Name and address of Construction Manager.
  5. RFI number including RFIs that were returned without action or withdrawn.
  6. RFI description.
  7. Date the RFI was submitted to the Architect.
  8. Date Architect's and Construction Manager's response was received.
- F. On receipt of Architect's and Construction Manager's action, immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven (7) days if Contractor disagrees with response.
1. Change in Work shall be recorded to the Project Record set per Section 017839 "Project Record Documents".

## 1.7 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three (3) days of the meeting.

- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; each Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Lines of communications.
    - f. Procedures for processing field decisions and Change Orders.
    - g. Procedures for RFIs.
    - h. Procedures for testing and inspecting.
    - i. Procedures for processing Applications for Payment.
    - j. Distribution of the Contract Documents.
    - k. Submittal procedures.
    - l. Preparation of record documents.
    - m. Use of the premises.
    - n. Work restrictions.
    - o. Working hours.
    - p. Owner's occupancy requirements.
    - q. Responsibility for temporary facilities and controls.
    - r. Procedures for moisture and mold control.
    - s. Procedures for disruptions and shutdowns.
    - t. Construction waste management and recycling.
    - u. Parking availability.
    - v. Office, work, and storage areas.
    - w. Equipment deliveries and priorities.
    - x. First aid.
    - y. Security.
    - z. Progress cleaning.
  4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, Construction Manager, and Owner's Commissioning Authority of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility requirements.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.

- o. Compatibility of materials.
  - p. Acceptability of substrates.
  - q. Temporary facilities and controls.
  - r. Space and access limitations.
  - s. Regulations of authorities having jurisdiction.
  - t. Testing and inspecting requirements.
  - u. Installation procedures.
  - v. Coordination with other work.
  - w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for preparing operations and maintenance data.
    - e. Requirements for delivery of material samples, attic stock, and spare parts.
    - f. Requirements for demonstration and training.
    - g. Preparation of Contractor's punch list.
    - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - i. Submittal procedures.
    - j. Owner's partial occupancy requirements.
    - k. Installation of Owner's furniture, fixtures, and equipment.
    - l. Responsibility for removing temporary facilities and controls.
  4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Construction Manager will conduct progress meetings at **biweekly** intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Resolution of BIM component conflicts.

- 4) Status of submittals.
  - 5) Status of sustainable design documentation.
  - 6) Deliveries.
  - 7) Off-site fabrication.
  - 8) Access.
  - 9) Site utilization.
  - 10) Temporary facilities and controls.
  - 11) Progress cleaning.
  - 12) Quality and work standards.
  - 13) Status of correction of deficient items.
  - 14) Field observations.
  - 15) Status of RFIs.
  - 16) Status of proposal requests.
  - 17) Pending changes.
  - 18) Status of Change Orders.
  - 19) Pending claims and disputes.
  - 20) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
    - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F. Coordination Meetings: Construction Manager will conduct Project coordination meetings at **regular** intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work. Owner's Commissioning Authority, Construction Manager, and Architect will attend as deemed necessary.
  2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    - c. Review present and future needs of each contractor present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Resolution of BIM component conflicts.
      - 4) Status of submittals.
      - 5) Deliveries.
      - 6) Off-site fabrication.
      - 7) Access.
      - 8) Site utilization.
      - 9) Temporary facilities and controls.
      - 10) Work hours.
      - 11) Hazards and risks.
      - 12) Progress cleaning.
      - 13) Quality and work standards.
      - 14) Change Orders.
  3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

## **SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's construction schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Site condition reports.
  - 7. Special reports.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting schedules and reports.
  - 2. Section 014529 "Testing and Inspections" for submitting a schedule of tests and inspections.

#### **1.2 DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
  - 1. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file, where indicated.
  - 2. PDF electronic file
- B. Startup construction schedule.
  - 1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Daily Construction Reports: Submit at monthly intervals.
- F. Material Location Reports: Submit at monthly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Special Reports: Submit at time of unusual event.
  - 1. Adverse Weather Days: Document conditions affecting construction activities and submit within 24 hours of the event.

#### 1.4 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including phasing, work stages, area separations and interim milestones.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review submittal requirements and procedures.
  - 6. Review time required for review of submittals and resubmittals.
  - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 8. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
  - 9. Review and finalize list of construction activities to be included in schedule.
  - 10. Review procedures for updating schedule.

#### 1.5 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

### PART 2 PRODUCTS

#### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  4. Startup and Testing Time: Include no fewer than 20 days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.
  6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
  2. Work under More Than One Contract: Include a separate activity for each contract.
  3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner, if any.
  4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  6. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Uninterruptible services.
    - c. Use of premises restrictions.
    - d. Provisions for future construction.
    - e. Seasonal variations.
    - f. Environmental control.
  7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample testing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.
    - l. Building flush-out.
    - m. Startup and placement into final use and operation.
  8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a. Structural completion.
    - b. Temporary enclosure and space conditioning.
    - c. Permanent space enclosure.
    - d. Completion of mechanical installation.
    - e. Completion of electrical installation.
    - f. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.

2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

## 2.2 STARTUP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven (7) days of date established for the Notice to Proceed or Notice of Award, whichever is earlier.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

## 2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
  2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Refer to Section 007300 for additional requirements.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities.
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.

6. Changes in total float or slack time.
7. Changes in the Contract Time.

## 2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for the Notice to Proceed or the Notice of Award, whichever is earlier. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

## 2.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  1. List of subcontractors at Project site.
  2. List of separate contractors at Project site.
  3. Approximate count of personnel at Project site.
  4. Equipment at Project site.
  5. Material deliveries.
  6. High and low temperatures and general weather conditions, including presence of rain or snow.
  7. Accidents.
  8. Meetings and significant decisions.
  9. Unusual events (see special reports).
  10. Stoppages, delays, shortages, and losses.
  11. Meter readings and similar recordings.
  12. Emergency procedures.
  13. Orders and requests of authorities having jurisdiction.
  14. Change Orders received and implemented.
  15. Construction Change Directives received and implemented.
  16. Services connected and disconnected.
  17. Equipment or system tests and startups.
  18. Partial completions and occupancies.
  19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
  1. Material stored prior to previous report and remaining in storage.
  2. Material stored prior to previous report and since removed from storage and installed.
  3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner, Architect and Construction Manager within two day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

## PART 3 EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

## **SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.
  - 3. Final completion construction photographs.
- B. Related Requirements:
  - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
  - 2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### **1.2 INFORMATIONAL SUBMITTALS**

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
  - 1. Submit photos by uploading to web-based project software site or via email. Include copy of key plan indicating each photograph's location and direction.
  - 2. Identification: Provide the following information with each image description:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date photograph was taken.
    - f. Description of location, vantage point, and direction.
    - g. Unique sequential identifier keyed to accompanying key plan.

#### **1.3 FORMATS AND MEDIA**

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time from camera.
- D. File Names: Name media files with date, Project area, and sequential numbering suffix.

#### **1.4 CONSTRUCTION PHOTOGRAPHS**

- A. General: Take photographs with maximum depth of field and in focus.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
  - 1. Flag construction limits before taking construction photographs.

2. Take a minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
  3. Take a minimum of 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
  4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Periodic Construction Photographs: Take a minimum of 20 photographs biweekly. Select vantage points to show status of construction and progress since last photographs were taken.
- D. Final Completion Construction Photographs: Take a minimum of 20 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

## **SECTION 013300 - SUBMITTAL PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
  - 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
  - 2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
  - 3. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and Record Product Data.
  - 5. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### **1.2 DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Digital File Transfer: Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. A cloud-based ShareFile exchange which allows internal and external users to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

#### **1.3 ACTION SUBMITTALS**

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and Construction Manager and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
  - 4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal category: Action; informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.

- f. Scheduled date for Architect's and Construction Manager's final release or approval.
- g. Scheduled date of fabrication.
- h. Scheduled dates for installation.
- i. Scheduled dates for purchasing.
- j. Activity or event number.

#### 1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect, through the Construction Manager to Contractor, at a nominal cost, for use in preparing submittals.
  - 1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
    - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    - b. Digital Drawing Software Program: The Contract Drawings are available in Revit version 2023 using Windows 11 operating system.
    - c. Contractor shall execute a data licensing agreement form furnished by the Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect and Construction Manager reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Construction Manager's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. It is expected that the number of submittals sent to the Architect and the Architect's Consultants within any one-week period will be reasonable in number as to not create "undue hardship."
  - 2. It is expected that all submittals will be submitted within the durations outlined in the bid form as provided by each trade.
    - a. A \$100.00 per calendar day penalty will be assessed for any submittal received after durations received as provided by each trade. The penalty will be deducted from the contract through deductive change order. Only if written authorization from the Construction Manager to extend this time frame can this "per day" penalty not be enforced.
    - b. The completion time of the contract will not be extended for delays caused by tardiness of submittals. Cost of such delays shall not be borne by the Owner and may be back-charged as necessary.
      - 1) Contractor shall assume full responsibility for providing materials as specified at their risk to maintain schedule if submittals are not submitted within durations provided on the bid form.
    - c. Upon receipt of unapproved submittals, Contractors will have seven (7) calendar days to revise and resubmit. After such time, the penalty outlined above in 1.4 C.1.a will be assessed.
  - 3. Initial Review: Allow 10 **business** days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
  - 4. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 5. Resubmittal Review: Allow 7 **business** days for review of each resubmittal.
  - 6. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 **business** days for initial review of each submittal.
  - 7. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 **business** days for review of each submittal. Submittal will be returned to Construction Manager, through Architect, before being returned to Contractor.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
    - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., OMLC-079200.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., OMLC-079200.01.A).
    - b. Specific material/product identifier: After listing the project identifier and section number as described above, clearly indicate the material/product submitted corresponding to specific paragraph in the specification (e.g., Silicone Joint Sealant – 2.2.A).
  3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect and Construction Manager.
  4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or electronic form acceptable to Owner, containing the following information:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Name of firm or entity that prepared submittal.
    - g. Names of subcontractor, manufacturer, and supplier.
    - h. Category and type of submittal.
    - i. Submittal purpose and description.
    - j. Specification Section number and title.
    - k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    - l. Drawing number and detail references, as appropriate.
    - m. Location(s) where product is to be installed, as appropriate.
    - n. Related physical samples submitted directly.
    - o. Indication of full or partial submittal.
    - p. Transmittal number numbered consecutively.
    - q. Submittal and transmittal distribution record.
    - r. Other necessary identification.
    - s. Remarks.
  5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
    - a. Project name.
    - b. Number and title of appropriate Specification Section.
    - c. Manufacturer name.
    - d. Product name.
- E. Options: Clearly identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Construction Manager on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with approval notation from Architect's and Construction Manager's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's and Construction Manager's action stamp.

## PART 2 PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Submit electronic submittals via email as PDF electronic files.
    - a. Architect, through Construction Manager, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
    - b. Along with the electronic submittal, Contractor shall submit to the Architect, one (1) full sized hard copy of each shop drawing for review and approval, as deemed necessary by the Architect.
    - c. Along with the electronic submittal, contractors shall submit to the Construction Manager, one (1) color deck or color card for each submittal requiring color selection for review, approval and color selection, as deemed necessary by the Architect.
  2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
  3. Submittals shall constitute an implied statement by the General Contractor and Subcontractor that the submitted items comply with the following statements:
    - a. Items have been reviewed and accepted by the General Contractor and Subcontractor.
    - b. Items have been verified and coordinated with specifications, measurements, conditions, and relevant criteria of the Contract Documents.
    - c. Items can be fabricated and delivered to the project site within the proposed project schedule.
  4. Review of submittals by the Architect and/or Owner shall not relieve the Contractor from full compliance with the Construction Documents.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to clearly show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts/decks.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before or concurrent with Samples and Shop Drawings, as applicable.
  6. Submit Product Data in the following format:
    - a. PDF electronic file according to Paragraph 2.1 A.1.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.

- c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
  - 3. Submit Shop Drawings in the following format:
    - a. PDF electronic file according to Paragraph 2.1 A.1.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
    - e. Specification paragraph number and generic name of each item.
  - 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
  - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Sample for "initial selection" shall be listed as a separate item in the submittal schedule.
    - b. Number of Samples: Unless specifically required otherwise in Specification Section, submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return submittal with options selected.
  - 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three sets of Samples. Architect and Construction Manager will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
  - 7. Electronic Transmittal: Provide PDF transmittal for all physical Samples. Include digital image file illustrating Sample characteristics, and identification information for record.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  - 2. Manufacturer and product name, and model number if applicable.
  - 3. Number and name of room or space.
  - 4. Location within room or space.
  - 5. Submit product schedule in the following format:
    - a. PDF electronic file.

- F. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."
- H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."
- I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."
- J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

- W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file in addition to three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. BIM File Incorporation: Incorporate delegated-design drawing and data files into Building Information Model established for Project.
  - 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.

## PART 3 EXECUTION

### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect and Construction Manager.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

### 3.2 ARCHITECT'S AND CONSTRUCTION MANAGER'S ACTION

- A. Action Submittals: Contractor is responsible for conforming and correlating dimensions at job sites for tolerances, clearances, quantities, fabrication processes, coordination of the Work with multiple trades, and full compliance with the Contract Documents. The Architect will review submittals for general conformance with the Contract Documents. Architect and Construction Manager will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect and Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action as follows:
  - 1. No Exception Taken: Signifies item represented in the submittal conforms to the design intent, complies with the intent of the Contract Documents and is acceptable for incorporation into the Work. Contractor is to proceed with fabrication or procurement and related work.
  - 2. Exceptions Noted: Signifies item represented in the submittal conforms to the design concept, complies with the intent of the Contract Documents, and is recommended for incorporation into the Work in accordance with the Architect's and/or Consultant's notations. Contractor is to proceed with the work in

- accordance the Architect's and/or Consultant's notations marked on the returned submittal or letter of transmittal. Resubmittal is not required.
3. Revised and Resubmit: Signifies item represented in the submittal appears to conform to the design concept and comply with the intent of the Contract Documents, but information is either insufficient or contains discrepancies which prevent the Architect and/or his Consultant from completing his review. Contractor is to resubmit revised information. Fabrication or procurement of the item and related work is not to proceed until the submittal is acceptable.
  4. Not Accepted: Signifies item represented in the submittal does not conform to the design concept or comply with the intent of the Contract Documents and is not recommended for incorporation into the Work. Contractor shall submit items responsive to the Contract Documents.
- B. Informational Submittals: Architect and Construction Manager will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect and Construction Manager will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect and Construction Manager.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Commissioning Authority, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.

#### 1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.
- C. Mockups/Field Samples: Full-size physical assemblies that are constructed on-site. Mockups/field samples are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups/Field Samples are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
  - 1. Integrated Field Samples: Field samples of select portions exterior envelope or interior construction erected as part of the Work. Field samples may consist of multiple products, assemblies, and subassemblies.
  - 2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application,

and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means, unless otherwise specified in the individual specification section, having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

### 1.3 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
1. Whenever Contract Documents reasonably infer materials or installation as necessary to produce the intended results, but do not fully detail or specify such materials, the Contractor shall provide the more expensive method or material, or greater quantity, unless he has obtained a written decision from the Architect.

### 1.5 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups/field samples, provide plans, sections, and elevations, indicating materials and size of mockup construction.
1. Indicate manufacturer and model number of individual components.
  2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

### 1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
  2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.

## 1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
  - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
  - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
  - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
  - 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

## 1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.

8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. **Manufacturer's Technical Representative's Field Reports:** Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. **Factory-Authorized Service Representative's Reports:** Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.
- D. **Permits, Licenses, and Certificates:** For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.9 QUALITY ASSURANCE

- A. **General:** Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
1. Refer to individual specification sections for additional requirements.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
  - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Construction Manager.
  - 2. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
  - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
  - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 5. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.
  - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 7. Unless otherwise indicated in the Contract Documents, demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.
- M. Field Samples: Construct/apply field samples using required materials, products, finishes and assemblies, finished according to requirements for the completed work. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work:
  - 1. Build field sample of size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect three (3) days in advance of dates and times when field samples will be constructed/applied.

3. Notify Architect and Construction Manager seven (7) days in advance of dates and times when field sample will be constructed/applied.
4. Demonstrate the proposed aesthetic effects and workmanship to be incorporated into the Work.
5. Obtain Architect's approval of field sample before starting remainder of work.
  - a. Allow three (3) days for initial review and each re-review of each field sample.
6. Field samples not acceptable to Architect shall be re-constructed/re-applied until field sample is accepted to Architect.
7. Maintain field sample during construction in an undisturbed condition as a standard for judging the completed Work.
8. Unless otherwise indicated in the Contract Documents, dispose of field sample when directed by Architect and Owner.

## 1.10 QUALITY CONTROL

- A. **Owner Responsibilities:** Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. **Contractor Responsibilities:** Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
  1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- D. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. **Testing Agency Responsibilities:** Cooperate with Architect, Commissioning Authority, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  1. Notify Architect, Commissioning Authority, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

#### 1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect, Commissioning Authority, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION

##### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's, and Construction Manager's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

## SECTION 014200 - REFERENCES

### PART 1 GENERAL

#### 1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### 1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. AABC - Associated Air Balance Council; [www.aabc.com](http://www.aabc.com)
  - 2. AAMA - American Architectural Manufacturers Association; [www.aamanet.org](http://www.aamanet.org).
  - 3. AAPFCO - Association of American Plant Food Control Officials; [www.aapfco.org](http://www.aapfco.org).
  - 4. AASHTO - American Association of State Highway and Transportation Officials; [www.transportation.org](http://www.transportation.org).
  - 5. AATCC - American Association of Textile Chemists and Colorists; [www.aatcc.org](http://www.aatcc.org).
  - 6. ABMA - American Bearing Manufacturers Association; [www.americanbearings.org](http://www.americanbearings.org).
  - 7. ABMA - American Boiler Manufacturers Association; [www.abma.com](http://www.abma.com).
  - 8. ACI - American Concrete Institute; (Formerly: ACI International); [www.concrete.org](http://www.concrete.org).

9. ACPA - American Concrete Pipe Association; [www.concrete-pipe.org](http://www.concrete-pipe.org).
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); [www.aeic.org](http://www.aeic.org).
11. AF&PA - American Forest & Paper Association; [www.afandpa.org](http://www.afandpa.org).
12. AGA - American Gas Association; [www.aga.org](http://www.aga.org).
13. AHAM - Association of Home Appliance Manufacturers; [www.aham.org](http://www.aham.org).
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); [www.ahrinet.org](http://www.ahrinet.org).
15. AI - Asphalt Institute; [www.asphaltinstitute.org](http://www.asphaltinstitute.org).
16. AIA - American Institute of Architects (The); [www.aia.org](http://www.aia.org).
17. AISC - American Institute of Steel Construction; [www.aisc.org](http://www.aisc.org).
18. AISI - American Iron and Steel Institute; [www.steel.org](http://www.steel.org).
19. AITC - American Institute of Timber Construction; [www.aitc-glulam.org](http://www.aitc-glulam.org).
20. AMCA - Air Movement and Control Association International, Inc.; [www.amca.org](http://www.amca.org).
21. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
22. AOSA - Association of Official Seed Analysts, Inc.; [www.aosaseed.com](http://www.aosaseed.com).
23. APA - APA - The Engineered Wood Association; [www.apawood.org](http://www.apawood.org).
24. APA - Architectural Precast Association; [www.archprecast.org](http://www.archprecast.org).
25. API - American Petroleum Institute; [www.api.org](http://www.api.org).
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; [www.asphaltroofing.org](http://www.asphaltroofing.org).
29. ASCE - American Society of Civil Engineers; [www.asce.org](http://www.asce.org).
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; [www.ashrae.org](http://www.ashrae.org).
32. ASME - ASME International; (American Society of Mechanical Engineers); [www.asme.org](http://www.asme.org).
33. ASSE - American Society of Safety Engineers (The); [www.asse.org](http://www.asse.org).
34. ASSE - American Society of Sanitary Engineering; [www.asse-plumbing.org](http://www.asse-plumbing.org).
35. ASTM - ASTM International; [www.astm.org](http://www.astm.org).
36. ATIS - Alliance for Telecommunications Industry Solutions; [www.atis.org](http://www.atis.org).
37. AWEA - American Wind Energy Association; [www.awea.org](http://www.awea.org).
38. AWI - Architectural Woodwork Institute; [www.awinet.org](http://www.awinet.org).
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; [www.awmac.com](http://www.awmac.com).
40. AWPA - American Wood Protection Association; [www.awpa.com](http://www.awpa.com).
41. AWS - American Welding Society; [www.aws.org](http://www.aws.org).
42. AWWA - American Water Works Association; [www.awwa.org](http://www.awwa.org).
43. BHMA - Builders Hardware Manufacturers Association; [www.buildershardware.com](http://www.buildershardware.com).
44. BIA - Brick Industry Association (The); [www.gobrick.com](http://www.gobrick.com).
45. BICSI - BICSI, Inc.; [www.bicsi.org](http://www.bicsi.org).
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); [www.bifma.org](http://www.bifma.org).
47. BISSC - Baking Industry Sanitation Standards Committee; [www.bissc.org](http://www.bissc.org).
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); [www.bwfbadminton.org](http://www.bwfbadminton.org).
49. CDA - Copper Development Association; [www.copper.org](http://www.copper.org).
50. CEA - Canadian Electricity Association; [www.electricity.ca](http://www.electricity.ca).
51. CEA - Consumer Electronics Association; [www.ce.org](http://www.ce.org).
52. CFFA - Chemical Fabrics and Film Association, Inc.; [www.chemicalfabricsandfilm.com](http://www.chemicalfabricsandfilm.com).
53. CFSEI - Cold-Formed Steel Engineers Institute; [www.cfsei.org](http://www.cfsei.org).
54. CGA - Compressed Gas Association; [www.cganet.com](http://www.cganet.com).
55. CIMA - Cellulose Insulation Manufacturers Association; [www.cellulose.org](http://www.cellulose.org).
56. CISCA - Ceilings & Interior Systems Construction Association; [www.cisca.org](http://www.cisca.org).
57. CISPI - Cast Iron Soil Pipe Institute; [www.cispi.org](http://www.cispi.org).
58. CLFMI - Chain Link Fence Manufacturers Institute; [www.chainlinkinfo.org](http://www.chainlinkinfo.org).
59. CPA - Composite Panel Association; [www.compositepanel.org](http://www.compositepanel.org).
60. CRI - Carpet and Rug Institute (The); [www.carpet-rug.org](http://www.carpet-rug.org).
61. CRRC - Cool Roof Rating Council; [www.coolroofs.org](http://www.coolroofs.org).
62. CRSI - Concrete Reinforcing Steel Institute; [www.crsi.org](http://www.crsi.org).
63. CSA - Canadian Standards Association; [www.csa.ca](http://www.csa.ca).
64. CSA - CSA International; (Formerly: IAS - International Approval Services); [www.csa-international.org](http://www.csa-international.org).
65. CSI - Construction Specifications Institute (The); [www.csiresources.org](http://www.csiresources.org).
66. CSSB - Cedar Shake & Shingle Bureau; [www.cedarbureau.org](http://www.cedarbureau.org).
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); [www.cti.org](http://www.cti.org).
68. CWC - Composite Wood Council; (See CPA).

69. DASMA - Door and Access Systems Manufacturers Association; [www.dasma.com](http://www.dasma.com).
70. DHI - Door and Hardware Institute; [www.dhi.org](http://www.dhi.org).
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; [www.eciaonline.org](http://www.eciaonline.org).
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; [www.eima.com](http://www.eima.com).
76. EJMA - Expansion Joint Manufacturers Association, Inc.; [www.ejma.org](http://www.ejma.org).
77. ESD - ESD Association; (Electrostatic Discharge Association); [www.esda.org](http://www.esda.org).
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; [www.evo-world.org](http://www.evo-world.org).
80. FCI - Fluid Controls Institute; [www.fluidcontrolsintstitute.org](http://www.fluidcontrolsintstitute.org).
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); [www.fiba.com](http://www.fiba.com).
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); [www.fivb.org](http://www.fivb.org).
83. FM Approvals - FM Approvals LLC; [www.fmglobal.com](http://www.fmglobal.com).
84. FM Global - FM Global; (Formerly: FMG - FM Global); [www.fmglobal.com](http://www.fmglobal.com).
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; [www.floridaroo.com](http://www.floridaroo.com).
86. FSA - Fluid Sealing Association; [www.fluidsealing.com](http://www.fluidsealing.com).
87. FSC - Forest Stewardship Council U.S.; [www.fscus.org](http://www.fscus.org).
88. GA - Gypsum Association; [www.gypsum.org](http://www.gypsum.org).
89. GANA - Glass Association of North America; [www.glasswebsite.com](http://www.glasswebsite.com).
90. GS - Green Seal; [www.greenseal.org](http://www.greenseal.org).
91. HI - Hydraulic Institute; [www.pumps.org](http://www.pumps.org).
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; [www.hpva.org](http://www.hpva.org).
95. HPW - H. P. White Laboratory, Inc.; [www.hpwhite.com](http://www.hpwhite.com).
96. IAPSC - International Association of Professional Security Consultants; [www.iapsc.org](http://www.iapsc.org).
97. IAS - International Accreditation Service; [www.iasonline.org](http://www.iasonline.org).
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
101. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
102. ICPA - International Cast Polymer Alliance; [www.icpa-hq.org](http://www.icpa-hq.org).
103. ICRI - International Concrete Repair Institute, Inc.; [www.icri.org](http://www.icri.org).
104. IEC - International Electrotechnical Commission; [www.iec.ch](http://www.iec.ch).
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); [www.ieee.org](http://www.ieee.org).
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); [www.ies.org](http://www.ies.org).
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; [www.iest.org](http://www.iest.org).
109. IGMA - Insulating Glass Manufacturers Alliance; [www.igmaonline.org](http://www.igmaonline.org).
110. IGSHPA - International Ground Source Heat Pump Association; [www.igshpa.okstate.edu](http://www.igshpa.okstate.edu).
111. ILI - Indiana Limestone Institute of America, Inc.; [www.iliai.com](http://www.iliai.com).
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); [www.intertek.com](http://www.intertek.com).
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); [www.isa.org](http://www.isa.org).
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); [www.isfanow.org](http://www.isfanow.org).
116. ISO - International Organization for Standardization; [www.iso.org](http://www.iso.org).
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; [www.itu.int/home](http://www.itu.int/home).
119. KCMA - Kitchen Cabinet Manufacturers Association; [www.kcma.org](http://www.kcma.org).
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; [www.lightning.org](http://www.lightning.org).
122. MBMA - Metal Building Manufacturers Association; [www.mbma.com](http://www.mbma.com).
123. MCA - Metal Construction Association; [www.metalconstruction.org](http://www.metalconstruction.org).
124. MFMA - Maple Flooring Manufacturers Association, Inc.; [www.maplefloor.org](http://www.maplefloor.org).
125. MFMA - Metal Framing Manufacturers Association, Inc.; [www.metalframingmfg.org](http://www.metalframingmfg.org).
126. MHIA - Material Handling Industry of America; [www.mhia.org](http://www.mhia.org).
127. MIA - Marble Institute of America; [www.marble-institute.com](http://www.marble-institute.com).

128. MMPA - Moulding & Millwork Producers Association; [www.wmmpa.com](http://www.wmmpa.com).
129. MPI - Master Painters Institute; [www.paintinfo.com](http://www.paintinfo.com).
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; [www.mss-hq.org](http://www.mss-hq.org).
131. NAAMM - National Association of Architectural Metal Manufacturers; [www.naamm.org](http://www.naamm.org).
132. NACE - NACE International; (National Association of Corrosion Engineers International); [www.nace.org](http://www.nace.org).
133. NADCA - National Air Duct Cleaners Association; [www.nadca.com](http://www.nadca.com).
134. NAIMA - North American Insulation Manufacturers Association; [www.naima.org](http://www.naima.org).
135. NBGQA - National Building Granite Quarries Association, Inc.; [www.nbgqa.com](http://www.nbgqa.com).
136. NBI - New Buildings Institute; [www.newbuildings.org](http://www.newbuildings.org).
137. NCAA - National Collegiate Athletic Association (The); [www.ncaa.org](http://www.ncaa.org).
138. NCMA - National Concrete Masonry Association; [www.ncma.org](http://www.ncma.org).
139. NEBB - National Environmental Balancing Bureau; [www.nebb.org](http://www.nebb.org).
140. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
141. NeLMA - Northeastern Lumber Manufacturers Association; [www.nelma.org](http://www.nelma.org).
142. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
143. NETA - InterNational Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
144. NFHS - National Federation of State High School Associations; [www.nfhs.org](http://www.nfhs.org).
145. NFPA - National Federation of State High School Associations; [www.nfpa.org](http://www.nfpa.org).
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; [www.nfrc.org](http://www.nfrc.org).
148. NHLA - National Hardwood Lumber Association; [www.nhla.com](http://www.nhla.com).
149. NLGA - National Lumber Grades Authority; [www.nlga.org](http://www.nlga.org).
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
151. NOMMA - National Ornamental & Miscellaneous Metals Association; [www.nomma.org](http://www.nomma.org).
152. NRCA - National Roofing Contractors Association; [www.nrca.net](http://www.nrca.net).
153. NRMCA - National Ready Mixed Concrete Association; [www.nrmca.org](http://www.nrmca.org).
154. NSF - NSF International; [www.nsf.org](http://www.nsf.org).
155. NSPE - National Society of Professional Engineers; [www.nspe.org](http://www.nspe.org).
156. NSSGA - National Stone, Sand & Gravel Association; [www.nssga.org](http://www.nssga.org).
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); [www.ntma.com](http://www.ntma.com).
158. NWFA - National Wood Flooring Association; [www.nwfa.org](http://www.nwfa.org).
159. PCI - Precast/Prestressed Concrete Institute; [www.pci.org](http://www.pci.org).
160. PDI - Plumbing & Drainage Institute; [www.pdionline.org](http://www.pdionline.org).
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); [www.plasa.org](http://www.plasa.org).
162. RCSC - Research Council on Structural Connections; [www.boltcouncil.org](http://www.boltcouncil.org).
163. RFCI - Resilient Floor Covering Institute; [www.rfci.com](http://www.rfci.com).
164. RIS - Redwood Inspection Service; [www.redwoodinspection.com](http://www.redwoodinspection.com).
165. SAE - SAE International; [www.sae.org](http://www.sae.org).
166. SCTE - Society of Cable Telecommunications Engineers; [www.scte.org](http://www.scte.org).
167. SDI - Steel Deck Institute; [www.sdi.org](http://www.sdi.org).
168. SDI - Steel Door Institute; [www.steeldoor.org](http://www.steeldoor.org).
169. SEFA - Scientific Equipment and Furniture Association (The); [www.sefalabs.com](http://www.sefalabs.com).
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; [www.siaonline.org](http://www.siaonline.org).
172. SJI - Steel Joist Institute; [www.steeljoist.org](http://www.steeljoist.org).
173. SMA - Screen Manufacturers Association; [www.smainfo.org](http://www.smainfo.org).
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; [www.smacna.org](http://www.smacna.org).
175. SMPTE - Society of Motion Picture and Television Engineers; [www.smpte.org](http://www.smpte.org).
176. SPFA - Spray Polyurethane Foam Alliance; [www.sprayfoam.org](http://www.sprayfoam.org).
177. SPIB - Southern Pine Inspection Bureau; [www.spib.org](http://www.spib.org).
178. SPRI - Single Ply Roofing Industry; [www.spri.org](http://www.spri.org).
179. SRCC - Solar Rating & Certification Corporation; [www.solar-rating.org](http://www.solar-rating.org).
180. SSINA - Specialty Steel Industry of North America; [www.ssina.com](http://www.ssina.com).
181. SSPC - SSPC: The Society for Protective Coatings; [www.sspc.org](http://www.sspc.org).
182. STI - Steel Tank Institute; [www.steeltank.com](http://www.steeltank.com).
183. SWI - Steel Window Institute; [www.steelwindows.com](http://www.steelwindows.com).
184. SWPA - Submersible Wastewater Pump Association; [www.swpa.org](http://www.swpa.org).
185. TCA - Tilt-Up Concrete Association; [www.tilt-up.org](http://www.tilt-up.org).
186. TCNA - Tile Council of North America, Inc.; [www.tileusa.com](http://www.tileusa.com).
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; [www.tema.org](http://www.tema.org).
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); [www.tiaonline.org](http://www.tiaonline.org).

189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
  190. TMS - The Masonry Society; [www.masonrysociety.org](http://www.masonrysociety.org).
  191. TPI - Truss Plate Institute; [www.tpinst.org](http://www.tpinst.org).
  192. TPI - Turfgrass Producers International; [www.turfgrasssod.org](http://www.turfgrasssod.org).
  193. TRI - Tile Roofing Institute; [www.tilerroofing.org](http://www.tilerroofing.org).
  194. UL - Underwriters Laboratories Inc.; [www.ul.com](http://www.ul.com).
  195. UNI - Uni-Bell PVC Pipe Association; [www.uni-bell.org](http://www.uni-bell.org).
  196. USAV - USA Volleyball; [www.usavolleyball.org](http://www.usavolleyball.org).
  197. USGBC - U.S. Green Building Council; [www.usgbc.org](http://www.usgbc.org).
  198. USITT - United States Institute for Theatre Technology, Inc.; [www.usitt.org](http://www.usitt.org).
  199. WASTEC - Waste Equipment Technology Association; [www.wastec.org](http://www.wastec.org).
  200. WCLIB - West Coast Lumber Inspection Bureau; [www.wclib.org](http://www.wclib.org).
  201. WCMA - Window Covering Manufacturers Association; [www.wcmanet.org](http://www.wcmanet.org).
  202. WDMA - Window & Door Manufacturers Association; [www.wdma.com](http://www.wdma.com).
  203. WI - Woodwork Institute; [www.wicnet.org](http://www.wicnet.org).
  204. WSRCA - Western States Roofing Contractors Association; [www.wsrca.com](http://www.wsrca.com).
  205. WWPA - Western Wood Products Association; [www.wwpa.org](http://www.wwpa.org).
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. DIN - Deutsches Institut für Normung e.V.; [www.din.de](http://www.din.de).
  2. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
  3. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  4. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
1. COE - Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
  2. CPSC - Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
  3. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
  4. DOD - Department of Defense; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
  5. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
  6. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
  7. FAA - Federal Aviation Administration; [www.faa.gov](http://www.faa.gov).
  8. FG - Federal Government Publications; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  9. GSA - General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  10. HUD - Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
  11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; [www.eetd.lbl.gov](http://www.eetd.lbl.gov).
  12. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
  13. SD - Department of State; [www.state.gov](http://www.state.gov).
  14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; [www.trb.org](http://www.trb.org).
  15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
  16. USDA - Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).
  17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).
  18. USP - U.S. Pharmacopeial Convention; [www.usp.org](http://www.usp.org).
  19. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
  3. DSCC - Defense Supply Center Columbus; (See FS).
  4. FED-STD - Federal Standard; (See FS).
  5. FS - Federal Specification; Available from DLA Document Services; [www.quicksearch.dla.mil](http://www.quicksearch.dla.mil).
    - a. Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
    - b. Available from General Services Administration; [www.gsa.gov](http://www.gsa.gov).

- c. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org/ccb](http://www.wbdg.org/ccb).
  - 6. MILSPEC - Military Specification and Standards; (See DOD).
  - 7. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
  - 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
- 1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; [www.bearhfti.ca.gov](http://www.bearhfti.ca.gov).
  - 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; [www.calregs.com](http://www.calregs.com).
  - 3. CDHS; California Department of Health Services; (See CDPH).
  - 4. CDPH; California Department of Public Health; Indoor Air Quality Program; [www.cal-iaq.org](http://www.cal-iaq.org).
  - 5. CPUC; California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
  - 6. SCAQMD; South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
  - 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; [www.txforestservation.tamu.edu](http://www.txforestservation.tamu.edu).
  - 8. Colorado Department of Public Health & Environment; [www.colorado.gov/pacific/cdphe](http://www.colorado.gov/pacific/cdphe)
  - 9. Colorado Air Quality Control Commission; [www.colorado.gov/pacific/cdphe/aqcc](http://www.colorado.gov/pacific/cdphe/aqcc)
  - 10. Colorado Water Quality Control Division; [www.colorado.gov/pacific/cdphe/wqcd](http://www.colorado.gov/pacific/cdphe/wqcd)
  - 11. Colorado Geological Survey; Land Use Regulations; [www.coloradogeologicalsurvey.org/land-use-regulations/](http://www.coloradogeologicalsurvey.org/land-use-regulations/)

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

## **SECTION 014529 - TESTING AND INSPECTIONS**

### **PART 1 - GENERAL**

#### **1.1 GENERAL**

- A. The preceding "General Conditions" are a part of these specifications, and the Contractor shall consult them in detail in connection with this part of the work.

#### **1.2 SCOPE OF WORK**

- A. Employment of a testing and inspection firm approved and paid for by the Owner. Approximate scope of testing and inspection shall be as indicated on the drawings and herein specified in the sections of the specifications.
  - 1. Refer to attachment for scope of testing to be provided by Owner.

#### **1.3 TESTING AND INSPECTION CHARGES**

- A. For the following conditions, costs of testing and inspection services shall be paid for by the Contractor, apart from the Testing and Inspection.
  - 1. Costs arising from errors or omissions by the Contractor.
  - 2. Costs of concrete cores, of re-testing materials that fail, and of required identification of materials (mill tests, manufacturers certifications, etc.).
  - 3. Costs of test and inspections required to expedite the Contractors operations.

#### **1.4 CONCRETE WORK**

- A. Reinforcement shall be positively identified by heat numbers and mill analysis. Otherwise, Contractor shall provide test by qualified laboratory, one test for each 5 tons or fraction thereof, each size and type of reinforcing steel. Cement shall be from tested bins and properly identified at the mixing plant. Contractor shall provide to the testing laboratory aggregate samples for approval. Testing laboratory shall prepare 3 concrete cylinders for each 25 cubic yards, or fraction thereof placed – 2 cylinders to be tested at 7 days, and 1 cylinder at 28 days. Follow ASTM standards throughout.

#### **1.5 GENERAL TESTS AND INSPECTIONS**

- A. Observe all building code test and inspection requirements. Notify proper State, County and City authorities, for their required inspections.

### **PART 2 PRODUCTS (NOT APPLICABLE)**

### **PART 3 EXECUTION (NOT APPLICABLE)**

### **END OF SECTION**

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## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for products selected under an allowance.
  - 2. Section 012200 "Unit Prices" for products selected under a unit price.
  - 3. Section 012300 "Alternates" for products selected under an alternate.
  - 4. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 5. Section 014200 "References" for applicable industry standards for products specified.

#### 1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications.

#### 1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Architects Action: For comparable products submitted for "Cause", if necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later. For comparable products submitted for "Contractor's Convenience", Contractor must submit all information necessary to make a direct comparison to specified product for Architect's review, no additional information may be submitted.
    - a. Form of Approval: As specified in Section 012500 "Substitution Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

#### 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

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

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
  - 1. Store products to allow for inspection and measurement of quantity or counting of units.
  - 2. Store materials in a manner that will not endanger Project structure.
  - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 6. Protect stored products from damage and liquids from freezing.

#### 1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## PART 2 PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Architect will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
  - 1. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered prior to bidding only.
    - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  - 2. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered prior to bidding only.
    - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  - 3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

### 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 EXECUTION (NOT USED)

END OF SECTION

## **SECTION 017310 - CUTTING AND PATCHING**

### **PART 1 GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
  - 1. Division 1 Section "Selective Demolition" for demolition of selected portions of the building for alterations.
  - 2. Division 7 Section "Through-Penetration Firestop Systems" for patching fire-rated construction.
  - 3. Divisions 2 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
    - a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 23 and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

#### **1.3 DEFINITIONS**

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

#### **1.4 SUBMITTALS**

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
  - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
  - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
  - 3. Products: List products to be used and firms or entities that will perform the Work.
  - 4. Dates: Indicate when cutting and patching will be performed.
  - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
  - 6. Structural Elements: Where cutting and patching involve modifying structural elements, submit details and engineering calculations showing integration of modification with the original structure, stamped by a Professional Engineer licensed in the state of Kansas.
  - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive the right to later require removal and replacement of unsatisfactory work.

#### **1.5 QUALITY ASSURANCE**

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
  - 1. Refer questions over systems believed to be structural to the Architect.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

1. Primary operational systems and equipment.
  2. Air or smoke barriers.
  3. Fire-protection systems.
  4. Control systems.
  5. Communication systems.
  6. Conveying systems.
  7. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
1. Water, moisture, or vapor barriers.
  2. Membranes and flashings.
  3. Exterior curtain-wall construction.
  4. Equipment supports.
  5. Piping, ductwork, vessels, and equipment.
  6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.

## 1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

### 3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Division 32 Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  - 4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
  - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Patching and Repairing Existing Roof:
  - 1. Report discrepancies to Architect and Owner before disturbing existing conditions that could affect current warranty.
  - 2. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
  - 3. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 5. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
    - a. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

6. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during patching and repairing operations, by methods and with materials so as not to void existing warranties. Contractor to confirm materials used will not void existing warranties.

END OF SECTION

## **SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition waste.
  - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
  - 1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

#### **1.2 DEFINITIONS**

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- E. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

#### **1.4 QUALITY ASSURANCE**

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION**

#### **3.1 PLAN IMPLEMENTATION**

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until installation.
  - 4. Protect items from damage during transport and storage.
  - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
  - 1. Clean salvaged items.
  - 2. Store items in a secure area until delivery to Owner.
  - 3. Transport items to Owner's storage area designated by Owner.
- C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- E. Plumbing Fixtures: Separate by type and size.
- F. Lighting Fixtures: Separate lamps by type and protect from breakage.
- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

### 3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

## **SECTION 017700 - CLOSEOUT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for progress cleaning of Project site.
  - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Section 017839 "Project Record Documents" for submitting record Drawings and record Product Data.
  - 4. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

#### **1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

#### **1.5 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
  5. Submit test/adjust/balance records.
  6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
  6. Advise Owner of changeover in heat and other utilities.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements, including touchup painting.
  10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

## 1.6 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are

outside the limits of construction. Use CSI Form 14.1A.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
  - a. Project name.
  - b. Date.
  - c. Name of Architect
  - d. Name of Construction Manager.
  - e. Name of Contractor.
  - f. Page number.
4. Submit list of incomplete items in the following format:
  - a. PDF electronic file. Architect, through Construction Manager, will return annotated file.

## 1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
  1. General: Provide one (1) electronic copy and one (1) paper copy of warranties.
  2. Bind warranties and bonds in heavy-duty, three-ring, white vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  4. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  5. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## 1.9 PROJECT CLOSEOUT CHECK LIST

- A. Requirements: Contractor must provide the following prior to the Architect and Construction Manager approving the release of final payment:
  1. Verification that final punch list is complete.
  2. Final Affidavit.
  3. Consent of Surety.
  4. Final Lien Waiver.
  5. Affidavit of compliance with Prevailing Wage requirements.
  6. As-Built drawings applicable to this Contract.
  7. Operation and Maintenance Manuals applicable to this Contract.
  8. Current Insurance Certificate.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might

damage finished surfaces.

## PART 3 EXECUTION

### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - d. Remove snow and ice to provide safe access to building, as applicable.
    - e. Clean exposed exterior and interior hard-surface 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.
    - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Sweep concrete floors broom clean in unoccupied spaces.
    - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - j. Remove labels that are not permanent.
    - k. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
    - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
  - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

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## **SECTION 017823 - OPERATION AND MAINTENANCE DATA**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product maintenance manuals.
  - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### **1.2 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect and Commissioning Authority, as applicable, will comment on whether content of operations and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  - 1. General: Provide one (1) pdf electronic file and one (1) paper copy as follows:
    - a. PDF electronic file: Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
      - 1) Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
      - 2) Enable inserted reviewer comments on draft submittals.
    - b. Paper copy: Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect, through Construction Manager, will transmit paper copy to Owner upon acceptance.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least thirty (30) days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's and, as applicable, Commissioning Authority's comments. Submit copies of each corrected manual within ten (10) days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

## PART 2 PRODUCTS

### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

### 2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. General: Submit one (1) paper copy and one (1) copy in pdf electronic file format.
- B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- C. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor and Installer (if applicable).
  - 6. Name and contact information for Construction Manager.
  - 7. Name and contact information for Architect.
  - 8. Name and contact information for Commissioning Authority, as applicable.
  - 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  - 10. Cross-reference to related systems in other operation and maintenance manuals.
- D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- F. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, white vinyl-covered, post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
  2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
  4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
  5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
  2. Flood.
  3. Flood.
  4. Gas leak.
  5. Water leak.
  6. Power failure.
  7. Water outage.
  8. System, subsystem, or equipment failure.
  9. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

## 2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor has delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
  - 1. Product name and model number. Use designations for products indicated on Contract Documents.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.
  - 5. Operating characteristics.
  - 6. Limiting conditions.
  - 7. Performance curves.
  - 8. Engineering data and tests.
  - 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
  - 1. Startup procedures.
  - 2. Equipment or system break-in procedures.
  - 3. Routine and normal operating instructions.
  - 4. Regulation and control procedures.
  - 5. Instructions on stopping.
  - 6. Normal shutdown instructions.
  - 7. Seasonal and weekend operating instructions.
  - 8. Required sequences for electric or electronic systems.
  - 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

## 2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.

- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## PART 3 EXECUTION

### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of operation and maintenance manuals.
  - 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

## **SECTION 017839 - PROJECT RECORD DOCUMENTS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for final property survey.
  - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### **1.2 CLOSEOUT SUBMITTALS**

- A. General: Final Payment will not be made until Project Record Documents are submitted to, reviewed by and are acceptable to the Architect.
- B. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit one paper-copy set(s) of marked-up record prints.
      - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one (1) paper-copy set of marked-up record prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.
- C. Record Specifications: Comply with the following:
  - 1. Initial Submittal:
    - a. Submit one paper-copy set(s) of marked-up record specifications.
    - b. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
  - 2. Final Submittal:
    - a. Submit PDF electronic files of scanned and marked-up record specifications.
- D. Record Product Data: Submit one (1) paper copy and one (1) annotated PDF electronic file and directory of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- E. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one (1) paper copy and one (1) annotated PDF electronic file and directory of each submittal.
- F. Reports: Submit written report weekly, indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

## PART 2 PRODUCTS

### 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one (1) set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files:
  - 1. Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
    - a. Format: Annotated PDF electronic file with comment function enabled.
    - b. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
    - c. Refer instances of uncertainty to Architect through Construction Manager for resolution.
    - d. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
      - 1) See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
      - 2) Architect will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - 2. Format: Annotated PDF electronic file with comment function enabled.

3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:
  - a. Project name.
  - b. Date.
  - c. Designation "PROJECT RECORD DRAWINGS."
  - d. Name of Construction Manager.
  - e. Name of Architect.
  - f. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Refer to previous Article.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit one (1) copy of record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
  1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as one PDF electronic file and a separate paper copy of marked-up miscellaneous record submittals].
  1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

## PART 3 EXECUTION

### 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

## **SECTION 017900 - DEMONSTRATION AND TRAINING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Pre-Produced demonstration and training videos.

#### **1.2 INFORMATIONAL SUBMITTALS**

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced (pre-produced) demonstration and training video recordings for systems, equipment, and products.
- B. Qualifications: For Instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Pre-Produced Demonstration and Training Video Recordings: Submit two (2) copies within seven days of end of training.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name of Architect.
    - c. Name of Construction Manager.
    - d. Name of Contractor.
    - e. Date of video recording.
    - f. Name and address of videographer.
  - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
  - 3. At completion of training, submit complete training manual(s) for Owner's use. One copy shall be prepared and bound in format matching operation and maintenance manuals, and the second copy shall be in PDF electronic file format on compact disc.

#### **1.4 QUALITY ASSURANCE**

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- C. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  - 1. Inspect and discuss locations and other facilities required for instruction.
  - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

## PART 2 PRODUCTS

### 2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  4. Operations: Include the following, as applicable:
    - a. Startup and shutdown procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.
    - d. Regulation and control procedures.
    - e. Control sequences.
    - f. Safety procedures.
    - g. Instructions on stopping.

- h. Normal shutdown instructions.
- i. Operating procedures for emergencies.
- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- l. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

### 3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Coordinate with Owner for number of participants, instruction times and location.
  - 2. Describe system design, operational requirements, criteria, and regulatory requirements.
  - 3. Owner will furnish Contractor with names and positions of participants.
    - a. Owner will have in attendance a participant to describe Owner's operational philosophy.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner, through Construction Manager, with at least seven (7) days' advance notice.
    - a. Notify Architect in writing of training schedule.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

### 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. Pre-Produced Video Recordings. Video recordings may be used as a component of each training module. Upon completion of training, furnish to Owner one (1) copy of each video used for training.

END OF SECTION

## **SECTION 024119 - SELECTIVE DEMOLITION**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Demolition and removal of selected portions of building or structure as indicated, and as required to accommodate new construction.
  - 2. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
  - 2. Section 017310 "Cutting and Patching" for cutting and patching procedures.

#### **1.2 DEFINITIONS**

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

#### **1.3 MATERIALS OWNERSHIP**

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
  - 1. Owner will retain "first right of refusal" for all demolished items.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

#### **1.4 PREINSTALLATION MEETINGS**

- A. Predemolition Conference: Conduct conference at Project site.
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.
  - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
  - 5. Review areas where existing construction is to remain and require protection.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicate the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator and stairs.
  - 5. Coordination of Owner's continuing occupancy of portions of existing building to ensure uninterrupted progress of Owner's on-site operations and of Owner's partial occupancy of completed Work.
- D. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.
  - 1. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

## 1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
  - 1. Prior to commencement of demolition, representatives of the Owner and the Contractor will inspect the project areas where work will be conducted, and designate items to be salvaged. Items to be salvaged shall be identified by tagging/labeling and listed on the inventory.

## 1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

## 1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - 1. Before selective demolition, Owner will remove the following items:
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. Hazardous materials will be removed by Owner before the start of Work.
    - a. Scheduling and phasing of hazardous materials removal shall be conducted prior to start of work in consultation with Contractor and Owner's forces. It may be necessary for portions of hazardous materials removal to occur after the start of construction. In such cases, areas where hazardous materials removal occurs shall be abandoned by Contractor during removal until hazardous materials removal is complete.

2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
  3. Contractor and Owner's forces shall each conduct work according to all applicable OSHA and EPA regulations.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.

## 1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

## 1.10 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate, and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
  1. Comply with requirements specified in Section 013233 "Photographic Documentation."
  2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
  - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. Arrange to shut off utilities with utility companies.
  - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.
- C. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

### 3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- C. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- D. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
- E. Remove temporary barricades and protections where hazards no longer exist.

### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering, and chopping. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  5. Maintain adequate ventilation when using cutting torches.
  6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  9. Locate temporary wall/knockout panels and remove to extent indicated, minimizing damage to existing adjacent construction to remain.
  10. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to Owner.
  4. Transport items to Owner's storage area designated by Owner.
  5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
  - 1. Remove existing roof membrane, flashings, copings, and roof accessories where required for new work.
  - 2. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
  - 3. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
- F. Wood Trim and Plaster: Carefully remove wood trim adjacent to interior plaster work to minimize damage to plaster work to remain. Remove loose plaster back to solid/sound plaster.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

### 3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

## SECTION 061000 - ROUGH CARPENTRY

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Miscellaneous framing with dimension lumber (061000.A01).
  - 2. Wood blocking, cants, and nailers (061000.A13)
  - 3. Preservative-treated wood blocking, cants and nailers (061000.A12).
  - 4. Fire-Retardant-Treated Wood blocking and nailers (061000.A16).
  - 5. Plywood blocking panels (061000.A19).
  - 6. Fire retardant treated plywood blocking and backing panels (061000.A20).
  - 7. Preservative-treated plywood blocking panels (061000.A22)
  - 8. Sill-Sealer Gaskets (061000.A11).
  - 9. Flexible Strip Flashing (061000.A24).
- B. Related Requirements:
  - 1. Section 012300 "Alternates" for those alternates effecting work of this Section.

#### 1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NLGA: National Lumber Grades Authority.
  - 2. SPIB: The Southern Pine Inspection Bureau.
  - 3. WCLIB: West Coast Lumber Inspection Bureau.
  - 4. WWPA: Western Wood Products Association.

#### 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 D 5664.
  - 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. Wood-preservative-treated wood.
  - 2. Fire-retardant-treated wood.
  - 3. Engineered wood products.
  - 4. Power-driven fasteners.

5. Post-installed anchors.
6. Expansion anchors and metal framing anchors.

## 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- A. Regional Materials: The following wood products shall be manufactured within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
  1. Dimension lumber, except treated materials.
- B. Certified Wood: The following wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
  1. Dimension lumber, except treated materials.
- C. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber 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. Dress lumber, S4S, unless otherwise indicated.
- D. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.
- E. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
  1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

### 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
  1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
  4. Wood floor plates that are installed over concrete slabs-on-grade.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
1. Treatment shall not promote corrosion of metal fasteners.
  2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
1. Framing for raised platforms and stages.
  2. Plywood blocking and backing panels.
  3. Roof construction.

## 2.4 DIMENSION LUMBER FRAMING

- A. Miscellaneous Framing (061000.A01): No. 2 grade.
1. Species:
    - a. Hem-fir (north); NLGA.
    - b. Mixed southern pine; SPIB.
    - c. Douglas fir-larch; WCLIB or WWPA.
  2. Refer to Article 2.2 and Article 2.3 for locations of preservative treated wood and fire retardant treated wood.

## 2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Preservative-treated blocking, grounds and nailers (061000.A12).
  2. Blocking, grounds and nailers (061000.A13).

- a. Blocking for wall-mounted cabinets and casework shall be 2x6, minimum.
- 3. Curbs and cants (061000.A14).
- 4. Furring (061000.A15).
- 5. Fire-retardant treated wood blocking and nailers (061000.A16).
- 6. Fire-retardant treated wood curbs and cants (061000.A17).
  - a. Rooftop equipment bases and support curbs.
- 7. Fire-retardant treated wood furring: (061000.A18).
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
  - 1. Mixed southern pine or southern pine; SPIB.
  - 2. Spruce-pine-fir; NLGA.
  - 3. Spruce-pine-fir (south); NeLMA, WCLIB, or WWP.
  - 4. Western woods; WCLIB or WWP.
- C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
  - 1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
  - 2. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWP.
  - 3. Western woods; WCLIB or WWP.
- 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.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.6 MISCELLANEOUS PLYWOOD PANELS

- A. General: DOC PS 1, Exposure 1, CD, non-fire-retardant treated and fire-retardant treated as noted below, in thickness indicated or, if not indicated, not less than 5/8-inch nominal thickness.
  - 1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  - 2. Plywood blocking and backing panels, non-fire-retardant treated (061000.A19).
  - 3. Fire-Retardant-Treated Plywood blocking and backing panels (061000.A20).
    - a. Note that plywood equipment backing panels are specified in Article below.
  - 4. Preservative Treated Plywood blocking and backing panels, non-fire-retardant treated (061000.A22).

## 2.7 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels (061000.A20): Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.
  - 1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## 2.8 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
  - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
  - 2. Where rough carpentry is preservative treated or fire-retardant-treated wood materials, provide Type 304 stainless steel fasteners or fasteners with corrosion-protective coating have a salt-spray resistance of more than 800 hours according to ASTM B117.

- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

## 2.9 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets (061000.A11): Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
  - 1. **[[ FOR EXTERIOR WOOD FRAMING ]]**
- B. Flexible Strip Flashing (061000.A24): Provide self-adhering, membrane, 40 mils thick.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work included, but are not limited to, the following:
    - a. Air-Shield by W. R. Meadows, Inc.
    - b. Blueskin by Henry Corp.
    - c. CCW 705 by Carlisle Coatings & Waterproofing.
    - d. Hyload S/A Through Wall Flashing by Hyload, Inc.
- C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
  - 1. Adhesives shall have a VOC content of 70 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

## PART 3 EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood blocking and backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- 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.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- F. Provide fire blocking in furrowed spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furrowed spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furrowed spaces.

2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
  - a. **[ FOR WOOD FRAMED WALLS ]**
- G. Sort and select lumber so that natural characteristics do 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.
- H. Comply with AWP A M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  1. Use inorganic boron for items that are continuously protected from liquid water.
  2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  1. NES NER-272 for power-driven fasteners.
  2. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code.
  3. ICC-ES evaluation report for fastener.
- K. Use steel common 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. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
  1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
  2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

### 3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for 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.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

### 3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood: Install 1-by-3-inch nominal-size furring vertically at 16 inches o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

### 3.4 PROTECTION

- A. 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.

- B. 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.

END OF SECTION

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## **SECTION 061600 - SHEATHING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Fire Rated plywood sheathing (061600.A02).
- B. Related Requirements:
  - 1. Section 012200 "Unit Prices" for those unit prices affecting work of this Section.
  - 2. Section 061000 "Rough Carpentry" for plywood backing panels.
  - 3. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.
  - 4. Section 072726 "Air-Barrier Coatings" for air barrier applied over wall sheathing.

#### **1.2 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **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 plywood complies 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 plywood complies with requirements. Include physical properties of treated materials.
  - 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
    - a. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
  - 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Evaluation Reports: For the following, from ICC-ES:
  - 1. Wood-preservative-treated plywood.
  - 2. Fire-retardant-treated plywood.

#### **1.5 QUALITY ASSURANCE**

- A. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
  - 1. Build integrated mockups of exterior wall assembly as indicated on Drawings, incorporating backup wall construction, window, storefront, door frame and sill, ties and other penetrations, and flashing to demonstrate crack and joint treatment and sealing of gaps, terminations, and penetrations of air-barrier sheathing assembly.
    - a. Coordinate construction of mockups to permit inspection and testing of sheathing before external insulation and cladding are installed.
    - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
    - c. If Architect determines mockups do not comply with requirements, reconstruct mockups until mockups are approved.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Testing Agency Qualifications:

1. For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

### 2.2 WOOD PANEL PRODUCTS - GENERAL

- A. Plywood: DOC PS1.
1. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
  2. Factory mark panels to indicate compliance with applicable standard.

### 2.3 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
1. Use treatment that does not promote corrosion of metal fasteners.
  2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D5516 and design value adjustment factors shall be calculated according to ASTM D6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F (76 deg C) shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and the following:
1. Roof and wall sheathing within 48 inches (1220 mm) of fire party walls.
  2. Wall sheathing.
  3. Roof sheathing.

4. Subflooring and underlayment for raised platforms.
5. Back side of parapets where indicated.

## 2.4 WALL SHEATHING

- A. Fire Retardant Treated Plywood Wall Sheathing: (061600.A02)
1. Span Rating: Not less than 16/0.
  2. Nominal Thickness: Unless specifically indicated otherwise, not less than 5/8 inch, except 3/4 inch at back sides of parapets.
  3. Size: 48 by 96 inches or as required for vertical installation without butt joints.

## 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. For roof and parapet sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
  2. For wall sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.
- E. Screws for Fastening Wood Structural Panels 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.
- F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
  2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

## PART 3 EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
  2. ICC-ES evaluation report for fastener.
- D. 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. Install fasteners without splitting wood.
- E. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall Sheathing:
    - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch apart at edges and ends.

END OF SECTION

## SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Interior plastic laminated clad panels (064023.A08).
  - 2. Custom plastic laminated clad casework (064023.A16).
  - 3. Metal Edge Trim (064023.A24 - TR2).
  - 4. Concealed Countertop Bracket (064023.A32).
  - 5. Exposed Countertop Bracket (064023.A33).
- B. Related Sections include the following:
  - 1. Section 055000 "Metal Fabrications" for decorative metal finished components.
  - 2. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
  - 3. Section 123200 "Manufactured Wood Casework" for premanufactured casework.
  - 4. Section 123666 "Solid Surfacing Countertops" for solid surfacing countertops.

#### 1.2 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
- B. Balanced Construction: Where exposed face of a panel is surfaced with high pressure plastic laminate and the opposite (back) surface shall receive a cabinet liner or backer sheet when that surface is not exposed to view.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, including hardware, accessories, and solid-surfacing material.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - 1. Show details full size.
  - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - 3. Show locations and sizes of cutouts and holes for items installed in architectural woodwork.
- C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.
- D. Samples for Verification:
  - 1. For each species and cut of lumber and wood trim with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 10-inch-long for trim.
  - 2. Plastic laminate-faced panel products, 8 by 10 inches for each color of plastic laminate panel. Include two edges with specified edging.
  - 3. Plastic laminates, 8 by 10 inches, for each color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
  - 4. Exposed cabinet hardware and accessories, one unit for each type.
  - 5. Solid-surfacing materials, 6 inches square.
  - 6. Display case door rail finish, 4 inches long.
  - 7. Display case brackets and standards, not less than 4 inches long.
  - 8. Pre-manufactured Merchandizing Wall System: 12" long x 12" board width, complete with accessories.
  - 9. Perforated Hardboard (Pegboard): 2'0" long x 12" board width, complete with accessories.
  - 10. Upholstery: Not less than 6-by-8-inch for each type of upholstery selected.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of product, signed by product manufacturer.
- B. Qualification Data: For Installer.

#### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance of not less than seven years under the current company name.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and plastic laminate finishes.
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
  - 1. Comply with "Premium" grading requirements, unless specifically specified otherwise.
- E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
- F. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.
- B. Stack lumber, trim, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install interior architectural woodwork materials that are wet, moisture damaged, or mold damaged.
  - 1. Indications that materials are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## 1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

## 1.9 WARRANTY

- A. Special Warranty for Hardware: Manufacturer's standard from in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Failure of operating hardware.
    - b. Deterioration of finishes.
  2. Warranty period: Three years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Regional Materials: Wood products shall be manufactured within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
- C. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- D. Wood Species and Cut for Transparent Finish: Red Oak, plain sliced/plain sawn. Refer to Material Finish Legend and Drawings for addition information and locations.
- E. Wood Products: Comply with the following:
  1. Hardboard: AHA A135.4.
  2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
    - a. Where Fire Retardant MDF or FRT MDF is indicated, MDF must meet class A requirements per ASTM E 84.
  3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
  4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
  5. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
  1. Basis of Design Products: Subject to compliance with requirements, provide "Formica" and "Wilsonart" or comparable product submitted to and accepted by Architect prior to bidding.
  2. Colors and Patterns: Refer to Material Finish Legend designations.
- G. Plastic-Laminate-Clad Panels: Particleboard or medium-density fiberboard core, ¾ inch thick, finished with plastic laminate, grade VGS in color as selected by Architect. Each panel shall be self-edged. Back panel face (non-exposed) to receive grade BKL backing sheet.
  1. Markerboard Panels (PL#) shall have markerboard edgebanding to match adjacent laminate in color and ability to erase markers. Basis of Design shall be by Rehau or a comparable manufacturer submitted to and

accepted by Architect.

- H. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that complies with applicable requirements in Section 079200 "Joint Sealants."
  - 1. Mildew-Resistant Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, silicone.
  - 2. Color: Clear.

## 2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this Article, acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified.
  - 1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
  - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
  - 3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use the following treatment type:
  - 1. Interior Type A: Low-hygroscopic formulation.
  - 2. Kiln-dry materials before and after treatment to levels required for untreated materials.

## 2.3 PLASTIC LAMINATE CLAD PANELS (064023.A08)

- A. General: Plastic-laminate-clad panels shall be fabricated with a particleboard or medium-density fiberboard core, 3/4 inch thick, finished with plastic laminate, grade VGS in color as selected by Architect. Each panel shall be self-edged. Back panel face (non-exposed) shall receive grade BKL backing sheet.
  - 1. Fabricate to sizes and configurations indicated.
  - 2. Finish as indicated on Drawings.

## 2.4 METAL EDGE TRIM (064023.A24)

- A. Millwork channel "L" angle with return key (064023.A24 - **TR2**): Subject to compliance with requirements, provide "MWCL100" by Fry Reglet Corporation or comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:
  - 1. Material: 6063-T5 Aluminum.
  - 2. Finish: Clear Anodized
  - 3. Projection from Substrate: 1/4 inch.
  - 4. Installed with 1 inch millwork panels at 90 degree outside corners.
  - 5. Provide clips in lengths as required to meet performance requirements.
  - 6. Installation: Mechanically fastened using manufacturer's recommended fasteners.
- B. Z-cleats for Mechanically Fastened Interior Panels: Subject to compliance with requirements, provide comparable product with the following product characteristics, submitted to and accepted by Architect prior to bidding:
  - 1. Material: 6063-T6 Aluminum.
  - 2. Depth: 1/4 inch.
  - 3. Length of Cleat: 2 inch minimum to 72 inches maximum.
    - a. Provide cleats in lengths as required to meet performance requirements.
  - 4. Installation: Mechanically fastened using manufacturer's recommended fasteners.

## 2.5 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
- B. Butt Hinges: Chrome-plated, semi-concealed, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and hospital tips. Provide 2 hinges for doors less than 48 inches high and 3 hinges for doors

more than 48 inches high.

- C. Frameless Concealed Hinges (European Type): 120 degrees of opening, self-closing. Provide two hinges for doors less than 48 inches high, and provide three hinges for doors more than 48 inches high.
  - 1. Basis-of-Design: Blum "Cliptop Blumotion Hinges"
  - 2. Basis-of-Design: Blum #71T5580 hinges and Blum hinge plate #174H7100E.
  - 3. Location: Provide at all custom casework pieces.
- D. Pulls: Solid aluminum pulls, fastened from back with two screws. Provide 2 pulls for drawers more than 24 inches wide.
  - 1. Solid aluminum or chrome-plated wire pulls, fastened from back with two screws. Provide 2 pulls for drawers more than 24 inches wide.
    - a. Basis of Design: Provide Hafele "116.05.931" matt aluminum handle.
      - 1) Diameter: 128mm.
- E. Drawer Slides: BHMA A156.9, Type B05091.
  - 1. Standard Duty (Grades 1, 2, and 3): Side mounted and extending under bottom edge of drawer; full - extension type; zinc-plated steel with polymer rollers.
  - 2. Box Drawer Slides: Grade 1, for drawers not more than 6 inches high and 24 inches wide.
  - 3. File and Flat-File Drawer Slides: Grade 1HD-100, for drawers more than 6 inches high or 24 inches wide.
- F. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.
  - 1. Adjustable shelf standards and brackets for glass shelves at display cases are specified in Section 088000.
- G. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  - 1. Satin Chromium Plated: Where not otherwise specified, provide BHMA 626 for brass or bronze base; BHMA 652 for steel base.
- H. Drawer and Hinged Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.
  - 1. Provide a minimum of two keys per lock and six master keys.
  - 2. Provide locks where indicated.
    - a. Key to Owner's master keying system. Coordinate with keying requirements of Section 087100 "Door Hardware".
- I. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- J. Concealed Countertop Bracket (064023.A32) – Basis-of-Design Product: Subject to compliance with requirements, provide the "Concealed Flat Bracket - C-Flat 2.0" by A&M Hardware, Inc., steel thickness and dimensions shall be sized to support carrying capacity. Comparable products will be considered when submitted to and accepted by Architect prior to bidding.
  - 1. Carrying capacity shall not be less than 1000 lbs., accommodating a counter depth of at least 25 inches.
  - 2. Coordinate solid wood blocking requirements for a concealed bracket installation prior to installation of drywall.
  - 3. Include upper extension as required.
  - 4. Color: As selected from manufacturers full range.
  - 5. Sizes: As determined by countertop size.
  - 6. Spacing: 24" on center.
- K. Exposed Countertop Bracket (064023.A33) – Basis-of-Design Product: Subject to compliance with requirements, provide A&M Hardware, Inc.; "Hybrid Bracket, HYB-1.5" without upper extension. Length of support arm varies, refer to Drawings. Color to be selected by Architect from manufacturer's full range of colors. Final color as indicated on drawings. Carrying capacity shall not be less than 450 lbs, accommodating a counter depth of at least 25 inches. Comparable products will be considered when submitted to and accepted by Architect prior to bidding.
  - 1. Coordinate solid wood blocking requirements for a concealed bracket installation prior to Installation of drywall.
  - 2. Color: As selected from manufacturers full range.
  - 3. Sizes: As determined by countertop size.
  - 4. Spacing: 24" on center.

- L. Transaction Counter Bracket: Basis-of-Design Product: Subject to compliance with requirements, provide products by A&M Hardware, Inc.; "Island and Bar Bracket", Model ISLBRKT and ISLBAR15. Brackets and bars shall be pre-fabricated from steel and factory finished. Steel thickness as determined by bracket manufacturer to support carrying capacity. Carrying capacity shall not be less than 350 lbs. Bracket, bar and fastener color shall be black. Bar size shall be 2 inches wide by 1/2 inch thick by 15 inches long. Bars shall be pre-drilled with multiple countersunk holes. Comparable products will be considered when submitted to and accepted by Architect prior to bidding.
  - 1. Spacing of brackets: As indicated.
  - 2. Transaction Counter Depth: As indicated.
- M. Hanging File Rails: Manufacturer's standard hanging file rail system. Provide integral system at all base cabinet drawers with dimensions that will accommodate hanging files.
  - 1. At 36" wide base file cabinets, provide rails on front and back for standard legal side filing. Provide two (2) removable crossbars per drawer for optional letter/legal front-to-back filing.
- N. Stand-Off Hardware: Provide products from CR Laurence Co. as indicated below. Fabricate from Type 316 stainless steel. Finish shall be brushed stainless steel. Provide all accessories necessary for mounting to underside of transaction counter.
  - 1. Stand-Off Base: Model SOB10112BS by CR Laurence (1-inch diameter by 1-1/2 inch long standoff sleeve).
  - 2. Stand-Off Cap: Model CAP1BS by CR Laurence (1-inch diameter standoff cap).
  - 3. Comparable products from other manufacturers will be considered.
- O. Hook: Hat/Coat hook. Color as selected by Architect.
  - 1. Basis-of-Design Product: Hafele; Model 842.34.050, finish: 100SS69, size: 40 x 60mm.
- P. Coat Hooks (123200.A19): Cast aluminum with A14, bright nickel finish. Provide double wardrobe hook, similar to Ives #582.
- Q. Pencil Drawers: Provide Doug Mockett; Model DWR6-90 or equivalent.
- R. Premanufactured Table Legs (064023.A33) – Basis-of-Design Product: Subject to compliance with requirements, provide products by Mockett; "Original Great Lookin' Legs – 3-inch diameter", steel thickness and dimensions shall be sized to support carrying capacity. Comparable products will be considered when submitted to and accepted by Architect prior to bidding.
  - 1. Model Number: "TL28R-3" by Mockett.
  - 2. Height: 28.5 inches high with recessed glide leveler.
  - 3. Weight Capacity: 300 lbs.
  - 4. Coordinate solid wood blocking requirements for table leg installation prior to fabrication of horizontal table or counter surface.
  - 5. Color: As selected by Architect from manufacturer's full range.

## 2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
- C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.
  - 1. Adhesives shall have a VOC content of 70 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.7 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
  - 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
  - 2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
  - 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
  - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- E. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.
- F. Install glass in display case doors in accordance with door manufacturer's instructions.
- G. Apply marker board laminate to flush wood doors on the non-primed face, in strict accordance with laminate manufacturer's written recommendations.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine all areas and conditions where solid surfacing fabrications will be installed. Notify Architect of any conditions that would adversely affect the installation. Do not proceed with installation until unsatisfactory conditions are corrected.
  - 1. Commencement of installation is construed as acceptance of the adjacent surfaces and conditions.

### 3.2 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and back priming.

### 3.3 INSTALLATION

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
- C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.
- F. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- G. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- H. Custom Casework - General: Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
  - 1. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
  - 2. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

### 3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
- D. Stainless Steel Protection: Provide 6-mil plastic or other suitable water-resistant covering over the countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION

## **SECTION 072500 - WEATHER BARRIERS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Self-adhering weather barrier (072500.A02).

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. For self-adhering building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.
- B. Shop Drawings: For weather-barrier assemblies.
  - 1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Evaluation Reports: For water-resistive barrier, from ICC-ES.
  - 1. Weather resistive barrier shall meet ICC-ES AC308 "Acceptance Criteria for Water Resistive Barriers".

#### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

### **PART 2 PRODUCTS**

#### **2.1 WATER-RESISTIVE BARRIER (072500.A02).**

- A. Basis-of-Design Products: Provide weather resistive barrier as a complete system, including but not limited to; self-adhering building wrap, self-adhering flashing, reinforced liquid flashing, tape and sealants. Subject to compliance with requirements, provide one of the following:
  - 1. VaproShield LLC; "VaproShield WrapShield SA".
  - 2. Henry Company; "BlueskinVP 160".
  - 3. Cosella-Dorken; "Delta-Vent SA".
  - 4. Comparable substitute meeting specified requirements, and which is submitted to and accepted by Architect prior to bidding.
- B. Performance Characteristics:
  - 1. Water-Vapor Permeance: Not less than 29 perms per ASTM E 96/E 96M, Method B.
  - 2. Air Leakage: Not greater than 0.004 CFM/sqft at 1.57 lbs./sqft when tested in accordance with ASTM E2178.
  - 3. Thickness shall not be less than 0.023 inches.
  - 4. Allowable UV Exposure Time: Not less than three months.
  - 5. Fire Performance Characteristics: Class A when tested in accordance with ASTM E 84.

#### **2.2 MISCELLANEOUS MATERIALS**

- A. General: Accessory materials recommended by weather-barrier manufacturer to produce a complete assembly and compatible with primary weather-barrier material

- B. Flexible Flashing: Weather resistive barrier manufacturer's standard composite, self-adhesive, flashing product.
- C. Liquid Flashing: Weather resistive barrier manufacturer's standard composite, liquid flashing and reinforcing mesh.
- D. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.
- E. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

## PART 3 EXECUTION

### 3.1 EXAMINATION AND SURFACE PREPARATION

- A. General: Examine and prepare surfaces to receive self-adhering building wrap/weather barrier in strict accordance with barrier manufacturer's written instructions, and as follows:
  1. All surfaces must be dry, sound, clean and free of oil, grease, dirt, excess mortar and other contaminants detrimental to adhesion of barrier membrane and flashings.
  2. Remove fins, ridges, mortar, and other projections.
  3. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

### 3.2 WATER-RESISTIVE BARRIER INSTALLATION

- A. General: Install weather-barrier and accessory materials according to manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous weather barrier.
  1. Apply flashing (liquid and membrane types) to comply with manufacturer's written instructions.
- B. Where recommended by weather barrier manufacturer, apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
  1. Where indicated, cover exposed exterior surface of sheathing indicated to receive metal fascia with water-resistive barrier securely adhered to sheathing as occurs. Stagger all end lap seams.
- C. Cover sheathing with water-resistive barrier as follows:
  1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
  2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap.
  3. Lap over adjacent construction and adhere to substrate. Cut back weather resistive barrier so it will not be exposed to view and will allow for edge of barrier to be covered with sealant.
  4. Install weather barrier and auxiliary materials to lap and seal to adjacent waterproofing and air barrier coating as occurs, to provide continuity of building envelope barrier.
- D. At end of each working day, seal top edge of weather barrier to substrate with termination mastic.
- E. Openings: Prime concealed, perimeter frame surfaces of windows, storefronts, and doors. Apply transitions and flashing (liquid or membrane) so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of weather-barrier material with flexible low-rise foam sealant.
- G. Seal top of through-wall flashings to weather barrier. Provide termination bar as recommended by weather barrier manufacturer.
- H. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Repair punctures, voids, and deficient lapped seams. Slit and flatten fishmouths and blisters. Extend patches 6 inches beyond repaired areas.

- J. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

### 3.3 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
  - 1. Prime substrates as recommended by flashing manufacturer.
  - 2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
  - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
  - 4. Lap water-resistive barrier over flashing at heads of openings.
  - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION

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## **SECTION 076200 - SHEET METAL FLASHING AND TRIM**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Formed Products:
    - a. Formed wall sheet metal fabrications.
    - b. Formed equipment support flashings.
    - c. Premanufactured pitch pockets.
- B. Related Sections:
  - 1. Section 061000 "Rough Carpentry " for wood nailers, curbs, and blocking.
  - 2. Section 072100 "Thermal Insulation"

#### **1.2 COORDINATION**

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints and seams to provide leakproof, secure and non-corrosive installation.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct Conference at Project Site.
  - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs and condition of other construction that affects sheet metal flashing and trim.
  - 3. Review requirements for insurance and certificates, if applicable.
  - 4. Review sheet metal flashing observation and repair procedures – post flashing installation.
  - 5. Meet with Owner, Architect, Installer and other Installers whose work interfaces with or affects sheet metal flashing and trim – including installers of roofing materials, roof accessories and roof-mounted equipment.
  - 6. Review methods and procedures related to sheet metal flashing and trim.
  - 7. Review special roof details, roof drainage, roof penetrations, equipment curbs and condition of other construction that will affect sheet metal flashing.
  - 8. Review sequencing of sheet metal flashing installation with other related trades to coordinate installation.
  - 9. Document proceedings, including corrective measures and actions required, and furnish copy of records to each participant.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
  - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
  - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  - 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  - 4. Details of termination points and assemblies, including fixed points.
  - 5. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashing as applicable.

6. Details of special conditions and of connections to adjoining work.
  7. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.
  8. Include details of roof-penetration flashing.
  9. Include details of expansion joints and expansion-joint covers – show direction of expansion and contraction joints from fixed points.
- C. Samples for Verification: For each type of exposed finish required, prepared on 6 inch square samples of actual metal to be used in the work.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified fabricator.
- B. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.
- C. Warranty: Sample of special warranty.

## 1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
  1. For copings and roof edge flashings that are SPRI ES-1 compliant, shop shall be SPRI ES-1 certified and listed as able to fabricate required details as tested and approved.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual", Sixth Edition, unless more stringent requirements are specified or shown on Drawings.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

## 1.8 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
  1. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:

- a. Design Pressure: As indicated on Drawings.
- 2. Sheet metal flashings shall be installed in accordance with ANSI/SPRI/FM 4435/ES-1 "Wind Design Standard for Edge Systems used with Low Slope Roofing Systems" as applicable for locations and configurations indicated on Drawings.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
  - 1. Contractor shall use gauges or thicknesses specified or as prescribed in the referenced standards for specific girths, whichever is greater.
- B. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
  - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
  - 2. Surface: Smooth, flat.
  - 3. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 4. Colors: As selected by Architect from manufacturer's full range.
  - 5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

## 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
  - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
  - 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Solder:
  - 1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Sealant Tape (076200.A02): Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch wide and 1/8 inch thick.

- E. Elastomeric Sealant (076200.A03): ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- J. Pre-Manufactured Pourable Sealer Pockets: Use only on non-structural penetrations that are flexible and those that are closely spaced. Provide pre-fabricated pourable sealer pocket system filled with fast-setting, solvent-free, multi-use waterproof sealer. Pre-fabricated pourable sealer pocket components shall connect together by means of tongue-and-groove joints, and shall be manufactured from a high-strength, flexible polyurethane elastomer. Pocket components shall join together to create pockets of varying sizes.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "Lockin Pocket interlocking Pitch Pocket System" as manufactured by Weather-Tite, or comparable product submitted to and accepted by Architect prior to bidding.
  - 2. Product Characteristics:
    - a. Pourable sealer pocket components and sealer color shall be black.
    - b. Height: Not less than 4 inches above field of roof.
    - c. Warranty: Not less than 2 years.

## 2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
  - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  - 2. Obtain field measurements for accurate fit before shop fabrication.
  - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
  - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch ( ) offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
  - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
  - 2. Use lapped expansion joints only where indicated on Drawings.
- E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- F. Do not use graphite pencils to mark metal surfaces.

## 2.5 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
  - 1. Coil-Coated Galvanized Steel: 0.034 inch thick.

## 2.6 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing (076200.A33): Fabricate from the following materials:
  - 1. Galvanized Steel: 0.034 inch thick.
- B. Pre-Finished Miscellaneous Metal Flashing and Trim (076200.A35): Fabricated from the following materials:
  - 1. Coil-Coated Galvanized Steel: 0.034 inch thick.
    - a. Color to be selected by Architect. Intent is to match surrounding brick color.
  - 2. At metal wall panels, fabricate to configurations indicated.
    - a. Provide hemmed edges all four sides.
  - b. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329. Color to match sheet metal panel.
- C. Premanufactured Pitch Pockets: A pre-fabricated interlocking pitch pocket system filled with fast setting, solvent free, multi-use waterproof sealer. Prefabricated pockets connect with tongue and groove joints and are composed of high strength, flexible elastomer. Pieces join together to create pockets of varying sizes.
  - 1. Basis-of-Design product: "Lockin' Pocket Interlocking Pitch Pocket System" by Weather-Tite.
  - 2. Product Characteristics:
    - a. Pocket and Sealer Color: Black.
    - b. Height: 4 inches above field of roof.
    - c. Warranty: Not less than 2 years.
  - 3. Prepare Substrates and install pitch pockets in accordance with manufacturer's printed instructions to accommodate substrates involved.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  - 3. Verify that air or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Space cleats not more than 12 inches apart. Anchor individual cleats with two fasteners and bend tabs over fasteners.. At continuous cleats, interlock bottom edge of roof edge flashing with continuous cleat. Anchor continuous cleat to substrate at 2 inches in from each end and then at not greater than 12-inch centers. Bend tabs over fasteners.
  - 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
  - 5. Install sealant tape where indicated.
  - 6. All lap joints in pre-finished miscellaneous metal flashing shall be sealed watertight.
  - 7. Torch cutting of sheet metal flashing and trim is not permitted.

8. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
    1. Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
    2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of EDPM underlayment and cover with a slip sheet or install a course of polyethylene sheet.
  - C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.
    1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
    2. Use lapped expansion joints only where indicated on Drawings.
  - D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
  - E. Seal joints as shown and as required for watertight construction.
    1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
    2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
  - F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
    1. Do not solder metallic-coated steel sheet.
    2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
    3. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

### 3.3 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 "Unit Masonry."
- C. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend ( )4 inches beyond wall openings.

### 3.4 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.
- B. Pre-Finished Miscellaneous Metal Flashing: Coordinate installation of flashing with adjoining construction and air barrier coating. Seal lap joints watertight.

### 3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of

matching profiles.

- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

### 3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers' written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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## **SECTION 078413 - PENETRATION FIRESTOPPING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Penetrations in fire-resistance-rated walls and floors
- B. Related Sections:
  - 1. Division 07 Section "Fire-Resistive Joint Systems" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
  - 1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

#### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
  - 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
    - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
    - b. Classification markings on penetration firestopping correspond to designations listed by the following:
      - 1) UL in its "Fire Resistance Directory."
- C. Preinstallation Conference: Conduct conference at Project site.

#### **1.5 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

## 1.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Grace Construction Products.
  - 2. Hilti, Inc.
  - 3. Johns Manville.
  - 4. Specified Technologies Inc.
  - 5. 3M Fire Protection Products.
  - 6. Tremco, Inc.; Tremco Fire Protection Systems Group.
  - 7. USG Corporation.
- B. Single Source Responsibility: All firestopping insulation, sealants, and related firestopping accessories required to prevent the passage of fire and smoke through fire rated penetrations, smoke rated penetrations and joints shall be furnished and installed by (or installed under direct supervision of) one contractor for the entire project. All products used for this work shall be furnished by one manufacturer for the entire project.

### 2.2 PENETRATION FIRESTOPPING (078413.A01)

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
  - 1. Fire-resistance-rated walls include fire walls fire-barrier walls and fire partitions.
  - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Architectural Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-wool-fiber or rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fillers for sealants.

2. Substrate primers.
  3. Collars.
- F. Firestopping compounds shall be paintable or capable of receiving finish materials in areas which are exposed to view and scheduled to receive finishes.

## 2.3 FILL MATERIALS

- A. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- B. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- C. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- D. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- E. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- F. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

## 2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
  1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
  2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
  3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

### 3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Designation of applicable testing and inspecting agency.
  - 4. Date of installation.
  - 5. Manufacturer's name.
  - 6. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Firestopping Manufacturer's representative shall perform and inspections of penetration firestopping. Contractor shall notify Architect and manufacturer's representative no later than seven days after penetration firestopping is complete to schedule inspection.
  - 1. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
  - 2. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

### 3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

END OF SECTION

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## **SECTION 078446 - FIRE RESISTIVE JOINT SYSTEMS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Joints in or between fire-resistance-rated constructions. (078446.A01).
- B. Related Sections:
  - 1. Division 07 Section "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.
  - 1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.

#### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements." Firm shall be experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:
  - 1. Fire-resistive joint system tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:
    - a. Fire-resistive joint system products bear classification marking of qualified testing agency.
    - b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:
      - 1) UL in its "Fire Resistance Directory."

## 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

## 1.6 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

## PART 2 PRODUCTS

### 2.1 FIRE-RESISTIVE JOINT SYSTEMS (078446.A01)

- A. Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:
  - 1. Joints include those installed in or between fire-resistance-rated walls floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.
  - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
  - 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Grace Construction Products.
    - b. Hilti, Inc.
    - c. Johns Manville.
    - d. Specified Technologies Inc.
    - e. 3M Fire Protection Products.
    - f. Tremco, Inc.; Tremco Fire Protection Systems Group.
    - g. USG Corporation.
- C. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
  - 1. Sealant shall have a VOC content of 250 g/L or less.
- D. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.
- E. Firestopping compounds shall be paintable or capable of receiving finish materials in areas which are exposed to view and scheduled to receive finishes.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
  - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
  - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

### 3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
  - 2. Apply fill materials so they contact and adhere to substrates formed by joints.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Designation of applicable testing agency.
  - 4. Date of installation.
  - 5. Manufacturer's name.

6. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Fire-Resistive Joint System manufacturer's representative will perform inspections of completed installation of work of this Section. Contractor shall notify Architect and manufacturer's representative not later than seven days after completion of fire-resistive joint system installation to schedule inspection.
- B. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.
- C. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

### 3.7 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.
- B. Wall-to-Wall, Fire-Resistive Joint Systems:
  1. UL-Classified Systems: WW-S-0000-0999.
  2. Assembly Rating: 2 hours.
  3. Nominal Joint Width: As indicated.
  4. Movement Capabilities: Class II - 25 percent compression or extension.
  5. L-Rating at Ambient: As selected by Contractor to suit project conditions.
- C. Floor-to-Wall, Fire-Resistive Joint Systems:
  1. UL-Classified Systems: FW-S-0000-0999.
  2. Assembly Rating: 2 hours.
  3. Nominal Joint Width: As indicated.
  4. Movement Capabilities: Class II - 25 percent compression, extension, or horizontal shear.
  5. L-Rating at Ambient: As selected by Contractor to suit project conditions.
- D. Head-of-Wall, Fire-Resistive Joint Systems (for Fire-Resistive Roof Systems):
  1. UL-Classified Systems: HW-S-0000-0999.
  2. Assembly Rating: 2 hours.
  3. Nominal Joint Width: As indicated.
  4. Movement Capabilities: Class II - 25 percent compression or extension.
  5. L-Rating at Ambient: As selected by Contractor to suit project conditions.
- E. Head-of-Wall, Fire-Resistive Joint Systems (for Non-Fire-Resistive Roof Systems):
  1. UL-Classified Systems: CJ-S-0000-0999.
  2. Assembly Rating: 2 hours.
  3. Nominal Joint Width: As indicated.
  4. Movement Capabilities: Class II - 25 percent compression or extension.
  5. L-Rating at Ambient: As selected by Contractor to suit project conditions.
- F. Perimeter Fire-Resistive Joint Systems:
  1. UL-Classified Perimeter Fire-Containment Systems: CW-S-0000-0999.

2. Integrity Rating: 2 hours.
3. Insulation Rating: 1 hour.
4. Linear Opening Width: As indicated.
5. Movement Capabilities: Class II - 25 percent compression or extension.
6. L-Rating at Ambient Temperature: As selected by Contractor to suit project conditions.

END OF SECTION

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## SECTION 079200 - JOINT SEALANTS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Urethane joint sealants.
  - 3. Latex joint sealants.
  - 4. Polyurea joint sealants.
  - 5. Hybrid silicone sealants.
- B. Related Sections:
  - 1. Section 078413 "Penetration Firestopping" for sealing penetrations in fire-resistance-rated construction.
  - 2. Section 078446 "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
  - 3. Section 088000 "Glazing" for glazing sealants.
  - 4. Section 092900 "Gypsum Board" for acoustical sealant and sealing acoustical joints.
  - 5. Division 32 Section "Concrete Paving Joint Sealants" for sealing joints in pavements, walkways, and curbing.

#### 1.2 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
  - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
  - 2. Conduct field tests for each application indicated below:
    - a. Each kind of sealant and joint substrate in exterior walls.
    - b. Sealant around perimeter of exterior windows/storefront.
  - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
  - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
    - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
      - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  - 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
  - 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.
- D. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- C. Field-Adhesion Test Reports: For each sealant application tested.
- D. Warranties: Sample of special warranties.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
  - 1. Refer to Section 042000 "Unit Masonry" for sealant joint in masonry mockups.
- D. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

#### 1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Sealants and sealant primers shall comply with the following:
  - 1. Architectural sealants shall have a VOC content of 250 g/L or less.
  - 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
  - 3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- G. Keynote Designations: Refer to schedule at end of this Section for types and applicable substrates.
  - 1. Sealant: (079200.A01).
  - 2. Sealant with backer rod: (079200.A02).
  - 3. Acoustical sealant: (079200.A04): Refer to Section 092900.
  - 4. Tape Sealant (079200.A05).

### 2.2 SILICONE JOINT SEALANTS

- A. Single-Component, Non-Staining, Non-sag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50 minimum, for Use NT.
  - 1. Products:
    - a. Tremco Incorporated; Spectrem 2.
    - b. Sika Products; Sikasil WS-295 FPS.
    - c. Dow; Dowsil 756 SMS Building Sealant.
    - d. Pecora; 890NST.
- B. Single-Component, Non-sag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
  - 1. Products:
    - a. Dow; Dowsil 790 Silicone Building Sealant.
    - b. Sika Products; Sikasil 728 NS.
    - c. Pecora Corporation; 311 NS.
- C. Mildew-Resistant, Single-Component, Non-sag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25 minimum, for Use NT.
  - 1. Products:
    - a. Tremco Incorporated; Spectrem 2.
    - b. Sika Products; Sikasil GP.

## 2.3 URETHANE JOINT SEALANTS

- A. Multicomponent, Non-sag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25 minimum, for Use NT.
  - 1. Products:
    - a. BASF Building Systems; Master Seal NP 2.
    - b. Tremco Incorporated; Dymonic 100.
    - c. Sika Products; Sikaflex; 2c NS EZ Mix.
    - d. Pecora Corporation; Dynatrol II.
- B. Multicomponent, Non-sag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25 minimum, for Use T.
  - 1. Products:
    - a. BASF Building Systems; Master Seal NP 2.
    - b. Tremco Incorporated; Dymonic 100.
    - c. Sika Products; Sikaflex; 2c NS EZ Mix.
    - d. Pecora Corporation; Dynatrol II.
- C. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade P, Class 25 minimum, for Use T.
  - 1. Products:
    - a. BASF Building Systems; Master Seal SL 2.
    - b. Sika Products; Sikaflex; 2c SL.
    - c. Pecora Corporation; Dynatrol II SG.

## 2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; Sonolac.
    - b. May National Associates, Inc.; Bondaflex Sil-A 700.
    - c. Pecora Corporation; AC-20+.
    - d. Tremco Incorporated; Tremflex 834.

## 2.5 POLYUREA SEALANTS

- A. Polyurea Sealant: Semi-rigid, self-leveling, 2-part type. Shore D hardness of 85 when tested in accordance with ASTM D 2240. Tensile strength of 1160 pounds per square inch when tested in accordance with ASTM D 412.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Curecrete Distribution Company, Inc.; Ashford Crete-Fill.
    - b. L&M Construction Chemical, Inc. Joint Tite 750.
    - c. Adhesives Technologies Corp.; Crackbond JF311.

## 2.6 HYBRID SILICONE SEALANTS FOR RESINOUS WALL TREATMENTS

- A. Basis of Design: Subject to compliance with requirements, provide one of products listed below or a comparable product, with the following product characteristics, submitted to and accepted by Architect.
  - 1. Products:
    - a. BASF; MasterSeal NP 100.
  - 2. Product Characteristics:
    - a. Classification: ASTM C920, Type S, Grade NS, Class 50, Use T.
    - b. Movement Capacity: +/- 50 percent.
    - c. Shore A Hardness: 17 to 23 per ASTM C 661.
    - d. Tensile Strength: 160-200 psi per ASTM D 412.
    - e. Tear Strength 22 lbs per inch per ASTM 1004.
    - f. Color: As selected by Architect from manufacturer's full range of custom options.

## 2.7 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings (079200.A04): ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape (079200.A05): Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.

- B. **Joint Priming:** Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. **Masking Tape:** Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. **General:** Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. **Sealant Installation Standard:** Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. **Install sealant backings** of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
  - 4. As sealant work progresses, install tube weeps at 24 inches on center along base of metal wall panels and where indicated.
- D. **Install sealants** using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. **Tooling of Non-sag Sealants:** Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
  - 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

### 3.4 FIELD QUALITY CONTROL

- A. **Field-Adhesion Testing:** Field test joint-sealant adhesion to joint substrates as follows:
  - 1. **Extent of Testing:** Test completed and cured sealant joints as follows:
    - a. Perform one test for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
  - 2. **Test Method:** Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
    - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  - 3. **Inspect tested joints** and report on the following:
    - a. Whether sealants filled joint cavities and are free of voids.
    - b. Whether sealant dimensions and configurations comply with specified requirements.
    - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
  5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

### 3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.7 JOINT-SEALANT SCHEDULE (079200.A01)

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
1. Joint Locations:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
    - b. Joints between different materials listed above.
  2. Urethane Joint Sealant: Multicomponent, pourable/non-sag, traffic grade, Class 25.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Control and expansion joints in unit masonry.
    - b. Joints in formed metal wall panels.
    - c. Joints within and at perimeter of storefront and curtain wall assemblies.
    - d. Control and expansion joints.
    - e. Joints between different materials listed above.
    - f. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    - g. Control and expansion joints in ceilings and other overhead surfaces.
  2. Silicone Joint Sealant: Single component, non-staining, non-sag, neutral curing, Class 50.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Other joints as indicated, except for expansion and control joints.
  2. Urethane Joint Sealant: Multicomponent, non-sag, traffic grade, Class 25.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:
    - a. Expansion joints in tile and resinous flooring.
  2. Silicone Joint Sealant: Single component, non-sag, traffic grade, neutral curing, Class 100/50.
  3. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior control/contraction joints in horizontal traffic surfaces.

1. Joint Locations:
    - a. Control/contraction joints in concrete slabs indicated to receive sealed finish, polished concrete finish, resinous flooring and joints in slabs on grade extending to building exterior, seal watertight.
  2. Polyurea Joint Sealant: Polyurea, multi component, self-leveling, traffic grade.
  3. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Vertical joints on exposed surfaces of interior unit masonry and concrete.
  2. Joint Sealant: Urethane, multicomponent, non-sag, Class 25, paintable.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint Sealant Application: Interior joints in vertical surfaces.
1. Joint Locations:
    - a. Vertical joints in exposed surfaces of gypsum drywall partitions.
    - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
  2. Joint Sealant: Acrylic based, paintable.
  3. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.
- H. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
  2. Joint Sealant: Single component, non-sag, mildew resistant, acid curing, Silicone.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- I. Joint-Sealant Application: Interior control/contraction joints in vertical surfaces (Resinous Wall treatments)
1. Joint Locations:
    - a. Control and expansion joints in CMU, cement board, or gypsum board indicated to receive resinous wall treatment.
  2. Joint Sealant: Hybrid Silicone, single component, non-sag, Class 50, traffic grade.
  3. Joint Sealant Color: As selected by Architect from manufacturer's full range of custom colors.

END OF SECTION

## **SECTION 081113 - HOLLOW METAL DOORS AND FRAMES**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes hollow-metal work.
  - 1. Hollow-metal frame (081113.A31).
- B. Related Requirements:
  - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
  - 2. Section 099123 "Interior Painting" for field painting of hollow-metal work.
  - 3. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

#### **1.2 DEFINITIONS**

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

#### **1.3 COORDINATION**

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

#### **1.4 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Furnish a schedule of doors and frames using same reference numbers for details and openings as those on Drawings.
  - 2. Elevations of each door type.
  - 3. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
  - 4. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 5. Locations of reinforcement and preparations for hardware.
  - 6. Details of each different wall opening condition.
  - 7. Details of anchorages, joints, field splices, and connections.
  - 8. Details of accessories.
  - 9. Details of moldings, removable stops, and glazing.
  - 10. Details of conduit and preparations for power, signal, and control systems.
- C. Samples for Verification:
  - 1. For each type of exposed finish required, prepared on Samples of not less than 6 by 8 inches.
- D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
  - 1. Provide additional protection to prevent damage to factory-finished units.
  - 2. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- B. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

## 1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ceco Door Products; an Assa Abloy Group company.
  - 2. Curries Company; an Assa Abloy Group company.
  - 3. Republic Doors and Frames.
  - 4. Steelcraft; an Allegion company.
  - 5. Elco Manufacturing Inc.
  - 6. HMF Express.
  - 7. Southwestern Hollow Metal.
  - 8. Steward Steel Inc.
  - 9. West Central Manufacturing.
- B. Source Limitations:
  - 1. Obtain hollow-metal work from single source from single manufacturer.

### 2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
  - 2. For areas required to receive a fire rating greater than 45 minutes, fire testing shall be based on fire resistive criteria according to NFPA 251 or ASTM E119.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

1. For areas required to receive a fire rating of 45 minutes or greater, fire testing shall be based on fire resistive criteria according to NFPA 251 or ASTM E119.

## 2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.
  1. Physical Performance: Level B according to SDI A250.4.
  2. Frames (081113.A31):
    - a. Materials: Uncoated, steel sheet, minimum thickness of 0.067 inch (14 gauge).
      - 1) Provide metallic-coated cold rolled steel in areas exposed to moisture and as indicated on Drawings.
    - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
    - c. Construction: Face welded.
    - d. Reinforcement: Provide high frequency hinge reinforcement at top hinge location.
  3. Exposed Finish: Prime.

## 2.4 FRAME ANCHORS

- A. Jamb Anchors:
  1. General: Anchors for severe storm-resistant door and frame assemblies shall be of sufficient length to provide not less than 5 inches of embedment into adjacent wall construction at jamb.
  2. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  3. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
  4. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  5. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
  1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

## 2.5 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
  1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50,

respectively; passing ASTM E 136 for combustion characteristics.

- I. Glazing: Comply with requirements in Section 088000 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.6 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
  - 5. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - c. Compression Type: Not less than two anchors in each frame.
    - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
  - 6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
  - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  - 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
  - 3. Provide high frequency hinge reinforcement on top hinge only (two additional 10 gauge reinforcements are welded at 3 places each) on all door frames.
- E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted hairline joints.
  - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

4. Vision lights shall be "flush" type, without through-bolts, except for vision lights associated with fire-rated security glass as specified in Article 2.8 below.
5. Provide loose stops and moldings on inside of hollow-metal work.
6. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

## 2.7 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 2.8 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
- C. Provide high frequency hinge reinforcement on top hinge only (two additional 10 gauge reinforcements are welded at 3 places each) on all door frames.
- D. Reinforce doors and frames to receive continuous hinges where scheduled.

### 3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
  1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

- c. Install frames with removable stops located on secure side of opening.
- d. Install door silencers in frames before grouting.
  - 1) Provide mortar guards for hinge and strike plate cutouts and any electrical components attached to frames.
- e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
- f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
- g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
- 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
  - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
- 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
- 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
- 5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
- 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
- 8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
  - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

## SECTION 081416 - FLUSH WOOD DOORS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid-core doors with factory finished wood-veneer faces (081416.A01 – **Types A1, B1**).
  - 2. Factory finishing flush wood doors.
- B. Related Requirements:
  - 1. Section 081113 "Hollow Metal Doors and Frames" for hollow metal frames.
  - 2. Section 087100 "Door Hardware" for hardware in flush wood doors.
  - 3. Section 088000 "Glazing" for glass view panels in flush wood doors.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
  - 1. Dimensions and locations of blocking.
  - 2. Dimensions and locations of mortises and holes for hardware.
  - 3. Dimensions and locations of cutouts.
  - 4. Undercuts.
  - 5. Requirements for veneer matching.
  - 6. Doors to be factory finished and finish requirements.
  - 7. Fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For
  - 1. Factory finished doors.
- D. Samples for Verification:
  - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
    - a. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
  - 2. Frames for light openings, 6 inches long, for each material, type, and finish required.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Certificates: For door manufacturer as set forth in Quality Assurance article.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program.

- B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
  - 1. Do not deliver doors until building interior environmental conditions are maintained to meet Manufacturer's requirements for relative humidity.
- B. Package doors individually in plastic bags or cardboard cartons.
  - 1. Protect doors in place as necessary to prevent scratches, dents, and other damage.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.
- D. Do not place other items on top of stored doors.
- E. Do not drag doors across one another or across other surfaces.
- F. Handle doors using clean gloves.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors from single manufacturer.

### 2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
  - 1. Provide labels indicating that doors comply with requirements of grades specified.
  - 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. Regional Materials: Wood doors shall be manufactured within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project

site.

- C. Certified Wood: Wood doors shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
- F. WDMA I.S.1-A Performance Grade:
  - 1. Extra Heavy Duty.
- G. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
  - 2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  - 3. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
  - 4. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
  - 5. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- H. Smoke-and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.
- I. Particleboard-Core Doors:
  - 1. Particleboard: ANSI A208.1, Grade LD-2.
  - 2. Blocking: Provide wood blocking in particleboard-core doors as follows:
    - a. 5-inch top-rail blocking, in doors indicated to have closers.
    - b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
  - 3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- J. Heavy Duty Particleboard-Core Doors:
  - 1. PC-5 Bonded 5-ply Wood Based Particleboard Core Doors shall meet the WDMA Extra Heavy Duty Performance Level unless noted otherwise.
    - a. Provide with binder containing no urea-formaldehyde
- K. Mineral-Core Doors:
  - 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
  - 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as follows:
    - a. 5-inch top-rail blocking.
    - b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
    - c. 5-inch midrail blocking, in doors indicated to have armor plates.
    - d. 5-inch midrail blocking, in doors indicated to have exit devices.
  - 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
    - a. Screw-Holding Capability: 550 lbf per WDMA T.M.-10.

## 2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors (081416.A01 – **Type A1, B1**):

1. Grade: Premium, with Grade A faces.
2. Species:
  - a. Match species of existing wood doors at each location as determined by Architect and Owner from manufacturer's full range of options.
3. Cut:
  - a. Match cut of existing wood doors at each location as determined by Architect and Owner from manufacturer's full range of options.
4. Match between Veneer Leaves:
  - a. Match veneer matching of existing doors at project site.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Exposed Vertical and Top Edges: Same species as faces - edge Type A.
  - a. Stile edges shall be 2-ply, not less than 1-3/8 inch thick. Outer hardwood edge ply shall be 5/8 inch thick. Inner ply shall be structural composite lumber or hardwood. Stile edges shall be continuous and shall not be finger jointed.
8. Core: Particleboard or structural composite lumber.
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
  - a. MDF cross bands are not acceptable.
10. Color:
  - a. Factory Finish to match color of existing wood doors at each location as determined by Architect and Owner from manufacturer's full range of options.
11. Doors thickness for the sliding barn doors shall be 1-3/8 inches.

## 2.4 LIGHT FRAMES AND LOUVERS

- A. General: Light frames are to match light frames in existing doors for each school. Contractor shall field verify material type and profile for light frames.
- B. Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish.
  1. Colors to be selected by Architect from full range of manufacturer's options.
  2. Fire Rated Doors: Products shall be listed and labeled for use in doors with fire protection rating required on doors schedule on Drawings.

## 2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
  1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
  1. Fabricate door and transom panels with full-width, solid-lumber meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Factory cut and trim openings through doors.
  1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
  3. Louvers: Factory install louvers in prepared openings.

## 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish two faces, two vertical edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
    - a. Where top edge is visible from an upper level (occupiable space) top edge shall be finished.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:
  - 1. General: Intent is to match Architect's control sample.
  - 2. Grade: Premium.
  - 3. Finish: Provide one of the following finishes:
    - a. AWI's "Architectural Woodwork Standards" System 10, UV curable, water based polyurethane.
    - b. WDMA TR-6 catalyzed polyurethane.
  - 4. Staining: Match existing and provide sample for Architect and Owner approval.
  - 5. Effect: Semifinished finish, produced by applying an additional finish coat to partially fill the wood pores.
  - 6. Sheen: Satin.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
  - 1. Install fire-rated doors according to NFPA 80.
  - 2. Install smoke- and draft-control doors according to NFPA 105.
  - 3. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
    - b. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

### 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.

- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

## **SECTION 083113 - ACCESS DOORS AND FRAMES**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Access doors and frames for walls and ceilings (083113.A01).
- B. Related Requirements:
  - 1. Section 042000 "Unit Masonry" for coordinating doors and frames set in masonry.
  - 2. Section 233300 "Air Duct Accessories" for heating and air-conditioning duct access doors.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

### **PART 2 PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

#### **2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Babcock-Davis.
  - 2. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
  - 3. Karp Associates, Inc.
  - 4. Larsen's Manufacturing Company.
  - 5. Milcor Inc.
  - 6. Nystrom, Inc.
- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- C. Flush Access Doors with Exposed Flanges (083113.A01 – Type 1):
  - 1. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard-width exposed flange, proportional to door size.
  - 2. Locations: Wall and ceiling.
  - 3. Door Sizes:
    - a. 24" x 24" unless otherwise specified.
    - b. 12" x 12" where indicated for access to water shut-off valves.
  - 4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage.
    - a. Finish: Factory prime.

5. Metallic-Coated Steel Sheet for Door: Provide in restrooms and other wet areas. Nominal 0.064 inch, 16 gage.
    - a. Finish: Factory prime.
  6. Frame Material: Same material, thickness, and finish as door.
  7. Hinges: Manufacturer's standard.
  8. Hardware: Provide hardware as follows:
    - a. At non-public spaces provide latching hardware.
    - b. At public spaces accessible to students, provide locking hardware.
- D. Hardware:
1. Latch: Cam latch operated by screwdriver.

## 2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: Same type as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

## 2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
  1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
  1. For cylinder locks, furnish two keys per lock and key all locks alike.

## 2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

### 3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Position units to provide convenient access to concealed equipment when necessary.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

### 3.4 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

## END OF SECTION

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## **SECTION 084113 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Non-Thermal Broken Storefront Framing (4.5") (084113.A06).
  - 2. Aluminum Door (Heavy Duty) (084113.A12).
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for installation of joint sealants installed in storefronts and entrance framing and for sealants not specified in this Section.
  - 2. Section 087100 "Door Hardware" for door hardware for aluminum doors.
  - 3. Section 088000 "Glazing" for glass within storefront and entrance systems.
  - 4. Section 092900 "Gypsum Board " for mullion closure at partition gaps.

#### **1.2 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, installation instructions, material descriptions, dimensions of individual components and profiles, hardware, accessories and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
  - 1. Elevations shall be drawn at ½ inch scale.
  - 2. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
  - 3. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Interface with adjoining building construction.
    - d. Expansion provisions.
    - e. Glazing.
    - f. Flashing and drainage.
  - 4. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
  - 5. Shop Drawings shall be signed and sealed by a structural engineer licensed in the state where the project is located.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
  - 1. Architect reserves the right to require additional samples for verification purposes that show fabrication techniques and workmanship.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
  - 1. Joinery, including concealed welds.
  - 2. Anchorage.
  - 3. Expansion provisions.
  - 4. Glazing.
  - 5. Flashing and drainage.

- F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- G. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of aluminum-framed systems.
  - 2. Include design calculations.
  - 3. Indicate design solutions for deflections of overhead structure as indicated on Structural Drawings.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and field-testing agency.
- B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
  - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Preconstruction Test Reports: For sealant.
- E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
- F. Source quality-control reports.
- G. Field quality-control reports.
- H. Sample Warranties: For special warranties.

#### 1.5 QUALITY ASSURANCE

- A. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- C. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.
- E. Listings and Labels for Fire-Rated Framing: Fire rated framing and glazing shall be under current follow-up services by an approved independent agency and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.
- F. Source Limitations:
  - 1. For Aluminum-Framed Storefront Systems: Obtain from single source from single manufacturer.
  - 2. For Heavy-Duty Door Systems: Obtain from single source from single manufacturer.

## 1.6 MOCKUPS

- A. Mockups/Field Samples: Build mockups/field samples, to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Mockups/Field Samples: Furnish and install quantity and size of aluminum windows indicated on Drawings within mockup constructed under Section 042000 "Unit Masonry." Mockup/Field Sample will be used set quality standards for materials and execution.
    - a. Install aluminum window to demonstrate surface preparation and installation of: jamb closure membrane, subsill, window framing, and application of perimeter window sealant and associated flashing.
    - b. Window shall include specified glazing where mockup is erected.
    - c. Maintain a 3/8 to 1/2 inch wide gap around entire perimeter of window to receive sealant.
    - d. Coordinate installation of window within mockups to permit inspection by Architect. Approved window installation will set quality standard of installation and aesthetic qualities of workmanship for project.
  - 2. Field Samples: Build field sample/mockup of typical wall areas as shown on Drawings.
    - a. Note: Mockup shall be a field sample of storefront, entrance and punched opening areas in Project. Architect and manufacturer's representative will observe installation of first 100 square feet of storefront installation and 100 square feet of entrance framing installation.
  - 3. Field testing shall be performed on field sample areas according to requirements in "Field Quality Control" Article.
  - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 5. Subject to compliance with requirements, approved mockups/field sample areas may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver aluminum framing components in manufacturer's original protective packaging.
- B. Store aluminum components in a clean dry location away from uncured masonry and concrete. Cover components with waterproof paper, tarpaulin or polyethylene sheeting in a manner to permit circulation of air.
  - 1. Stack framing components in a manner that will prevent bending and avoid damage.

## 1.8 PROJECT CONDITIONS

- A. Field Measurements: Check openings by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay in the work.
- B. Commencement of aluminum entrance and storefront work will be construed as Installer's acceptance of substrate surfaces and rough openings indicated to receive work of this Section.

## 1.9 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration created by wind and thermal and structural movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water penetration through fixed glazing and framing areas.
    - e. Failure of operating components.
  - 2. Warranty Period: Two years from date of Substantial Completion.
  - 3. Warranty period for heavy-duty doors and associated frames shall be ten (10) years from date of Substantial Completion.

- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  - 2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- C. Structural Loads:
  - 1. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
  - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
  - 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
    - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
    - b. Refer to Structural Drawings for additional information regard structure and deflection criteria.
  - 3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
    - a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.
- E. Structural: Test according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Heavy Duty Aluminum Storefront Doors and Frames:
  - 1. Swing Door Cycle Test: Test doors and frames according to ANSI A250.4 as follows:
    - a. Minimum 16,000,000 cycles.
  - 2. Cycle Slam Test Method: Test according to NWWDA T.M. 7-90 as follows:
    - a. Minimum 1,000,000 cycles.
- G. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.

## 2.2 MANUFACTURERS AND PRODUCTS

- A. Basis-of-Design Criteria: Drawings indicate sizes, profiles, and dimensional requirements for storefront, entrance and window framing systems required, that are based on specific types, models and performance criteria indicated. Systems from other manufacturers may be considered, provided deviations in dimensions, profiles and performance are minor and do not change the design concept as judged by the Architect. Burden of proof is on the proposer.
- B. Basis-of-Design Products for Storefront Framing Systems: Subject to compliance with requirements, provide or one of the systems listed below or comparable product submitted to and accepted by Architect prior to bidding.
  1. Non-thermal Storefront and Entrance Framing (084113.A06 – **Type 2** - Center Plane Glazed):
    - a. Basis-of-Design: Kawneer North America; Trifab VG 451.
    - b. EFCO Corporation; Series 402 NT.
    - c. Manko Windows and Doors; 450 Series.
    - d. Tubelite; 14000 Series (non-thermal).
  2. Interior standard-duty manual-swing doors (084113.A11 - **E10**):
    - a. Basis-of-Design: Kawneer North America; Series 500 Wide Stile.
      - 1) EFCO Corporation; D-500.
      - 2) Manko Windows and Doors; 150 Series.
      - 3) Tubelite; Comparable product.
- C. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

## 2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  1. Construction:
    - a. Non-Thermal
  2. Glazing System:
    - a. Retained mechanically with gaskets on four sides.
  3. Glazing Plane:
    - a. Interior Locations:
      - 1) Center plane glazed.
  4. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Pressure Caps: Manufacturer's standard snap-on aluminum caps that mechanically retain glazing.
  1. Provide extended caps where indicated.
  2. At 90 degree outside corners, provide pre-manufactured mullion cap/trim as single unit to cover both sides where shown.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Materials:
  1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    - a. Sheet and Plate: ASTM B 209.
    - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
    - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
    - d. Structural Profiles: ASTM B 308/B 308M.
  2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface

preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

- a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
- b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
- c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

## 2.4 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.
  - 1. Sealant shall have a VOC content of 250 g/L or less.
  - 2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.5 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Exposed Fasteners: Do not use exposed fasteners except for application of hardware. For application of exposed hardware, use exposed fasteners with countersunk Phillips screw heads or flat-head machine screws, fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

## 2.6 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 5. Provisions for field replacement of glazing from interior.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Storefront Framing: Fabricate components for assembly using shear-block system, or screw-spline system, or head-and-sill-receptor system with shear blocks at intermediate horizontal members.

- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

## 2.8 SOURCE QUALITY CONTROL

- A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare surfaces that are in contact with sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

### 3.3 INSTALLATION

- A. General:
  - 1. Comply with manufacturer's written instructions.
  - 2. Do not install damaged components.
  - 3. Fit joints to produce hairline joints free of burrs and distortion.
  - 4. Rigidly secure non-movement joints.
  - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  - 6. Seal perimeter and other joints watertight unless otherwise indicated.
  - 7. Completely fill gaps between shims and adjacent construction with loose fiberglass insulation or spray foam insulation.
- B. Metal Protection:
  - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
  - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Prior to installation of perimeter vertical members, install jamb closure membrane at cavity walls to cover gap/joint between interior and exterior substrates. Intent is to seal air cavity and joints between substrates. Extend membrane from interior face of framing/blocking to exterior. Trim membrane so that it will not be exposed to view after vertical members are set, and edge of membrane is terminated in sealant installed around perimeter of aluminum framing.

1. Seal tops of end dams at jambs to adjacent construction or extend jamb closure membrane over end dam to direct water into subsill in order to drain to exterior.
- F. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- G. Install glazing as specified in Section 088000 "Glazing."

### 3.4 ERECTION TOLERANCES

- A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
  2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
  3. Alignment:
    - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
    - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
    - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
  4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
    - a. Perform tests in each test area as directed by Architect.
      - 1) For punched openings, test 25 percent of installation, in each type of exterior finish substrate, unless noted otherwise.
      - 2) For storefront, and clerestories; test each installation, unless noted otherwise.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION

## **SECTION 085613 - TRANSACTION WINDOWS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Sliding transaction windows (085613.A02).
- B. Related Requirements:
  - 1. Section 087100 "Door Hardware" for transaction window lock coordination.
  - 2. Section 088000 "Glazing" for laminated glass requirements for sliding window.

#### **1.2 COORDINATION**

- A. Coordinate installation of anchorages for windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for window units.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and attachments to other work.
  - 2. Full-size section details of framing members, including internal armoring, reinforcement, and stiffeners.
  - 3. Details of shelf.
  - 4. Hardware for sliding window units.
  - 5. Glazing details.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
  - 1. Framing: 12-inch-long sections of frame members.
  - 2. Glazing: 6-inch square sample.

#### **1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Examination reports documenting inspections of substrates, areas, and conditions.
- C. Sample Warranty: For special warranty.

#### **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Pack windows in wood crates for shipment. Crate glazing separate from frames unless factory glazed.
- B. Label window packaging with drawing designation.
- C. Store crated security windows on raised blocks to prevent moisture damage.

## 1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

## 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace windows that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including deflections exceeding 1/4 inch.
    - b. Failure of welds.
    - c. Excessive air leakage.
    - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  - 2. Warranty Period: Two years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 SLIDING TRANSACTION WINDOWS (085613.A02)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Quikserv "SC-3030 Self-Closing Side Sliding Transaction Window".
  - 1. Comparable products from other manufacturers meeting specified requirements will be considered, when submitted to Architect prior to bidding. Comparable products acceptable to Architect will be set forth by Addendum. Refer to Sections 012500 and 016000 for requirements on submitting comparable products.
- B. Product Characteristics and Features:
  - 1. Configuration: One fixed-glazed panel with one movable sliding glazed panel.
    - a. Unit size: 36 inches wide by 36 inches high.
    - b. Service Opening: 14-1/2 inches wide by 29 inches high.
    - c. Operation Type: Self-closing
    - d. Opening Direction:
      - 1) Right Hand Slide
    - e. Glass frame: Manufacture's standard aluminum frame.
    - f. Color: As selected by Architect to match color of existing adjacent painted frames, as determined by Architect and Owner.
    - g. Glazing: As indicated in Section 088000 "Glazing"
    - h. Latch: Manufacturer's standard spring latch with manual pull and thumb release which automatically locks on closing

### 2.2 FABRICATION

- A. General: Fabricate windows to provide a complete system for assembly of components and anchorage of window units.
  - 1. Provide units that are preglazed at the factory.
  - 2. Provide units that are reglazable from the secure side without dismantling the non-secure side of framing.
  - 3. Prepare teller windows for field glazing.

- B. Framing: Miter or cope corners the full depth of framing; weld and dress smooth.
- C. Glazing Stops: Finish glazing stops to match teller window framing.
  - 1. Non-Secure-Side (Exterior) Glazing Stops: Welded or integral to framing.
  - 2. Secure-Side (Interior) Glazing Stops: Removable, coordinated with glazing indicated.
- D. Welding: Weld components to comply with referenced AWS standard. To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- E. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- F. Weather Stripping: Factory applied.

## 2.3 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.4 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

## 2.5 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
  - 1. Run grain of directional finishes with long dimension of each piece.
  - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
  - 3. Directional Satin Finish: No. 4.

## 2.6 ACCESSORIES

- A. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.
- B. Cast-in-Place Anchors in Concrete: Fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified testing agency; of type indicated below.
  - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 27/A 27M cast steel or ASTM A 47/A 47M malleable iron. Provide bolts, washers, and shims as required; hot-dip galvanized according to ASTM A 153/A 153M or ASTM F 2329/F 2329M.
- C. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16 inch thick; with minimum 1/2-inch-diameter, headed studs welded to back of plate.
- D. Glazing Strips and Weather Stripping: Manufacturer's standard replaceable components.
  - 1. Compression Type: Molded EPDM or neoprene gaskets complying with ASTM D 2000, Designations 2BC415 to 3BC620; molded PVC gaskets complying with ASTM D 2287; or molded, expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.

2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric backing.
- E. Miscellaneous Glazing Materials: Provide material, size, and shape complying with requirements of glass manufacturers and with a proven record of compatibility with surfaces contacted in installation.
  1. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
  2. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
  3. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
  4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B 633; provide sufficient strength to withstand design pressures indicated.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- H. Sealants: For sealants required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.
- I. Speak through glass opening: formed from aluminum and securely set into glass vision panel.
  1. Basis-of-Design Product is C. R. Laurence Co., Inc.; Model 834A.
- J. Ticket window with hinged cover: formed from aluminum and securely set into glass vision panel.
  1. Basis-of-Design Product is C. R. Laurence Co., Inc.; Model 720A.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of security windows.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of security window connections before security window installation.
- C. Inspect built-in and cast-in anchor installations, before installing security windows, to verify that anchor installations comply with requirements. Prepare inspection reports.
  1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
  2. Perform additional inspections to determine compliance of replaced or additional work. Prepare anchor inspection reports.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other security window anchors whose installation is specified in other Sections.
  1. Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.

### 3.3 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing security windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
- B. Glazed Framing: Provide sealant-glazed framing. Comply with installation requirements in Section 088000 "Glazing."
- C. Removable Glazing Stops and Trim: Fasten components with security fasteners.

- D. Fasteners: Install security windows using fasteners recommended by manufacturer with head style appropriate for installation requirements, strength, and finish of adjacent materials. Provide stainless-steel fasteners in stainless-steel materials.
- E. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.
  - 1. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction unless otherwise indicated.
  - 2. Seal frame perimeter with sealant to provide weathertight construction unless otherwise indicated.
- F. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

### 3.4 FIELD QUALITY CONTROL

- A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.
- B. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

### 3.5 ADJUSTING

- A. Adjust horizontal-sliding, teller (transaction) windows to provide a tight fit at contact points for smooth operation and a secure enclosure.
- B. Remove and replace defective work, including teller windows that are warped, bowed, or otherwise unacceptable.

### 3.6 CLEANING AND PROTECTION

- A. Clean surfaces promptly after installation of windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
- B. As applicable, clean glass of preglazed security windows promptly after installation. Comply with requirements in Section 088000 "Glazing" for cleaning and maintenance.
- C. Provide temporary protection to ensure that windows are without damage at time of Substantial Completion.

END OF SECTION 085613

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## SECTION 087100 – DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Intent: The intent of this Section is to provide finish hardware for the proper operation and control of all wood, hollow metal and aluminum doors in the Project. Prior to bidding, notify the Architect of any doors that do not have hardware meeting this intention.
- B. This Section includes items known commercially as finish or door hardware that are required for swinging doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed. This Section includes, but is not necessarily limited to furnishing and installing complete, the following:
  - 1. Finish hardware for proper operation and control of all wood, aluminum and hollow metal doors, including hinges, locks and latch sets, closers, panic devices, auto-flushbolts, electric strikes, magnetic holders, removable mullions, cylinders, keys, miscellaneous stops, flat goods, weatherstripping and thresholds as required.
  - 2. Cylinder for access doors where specified.
- C. Related work in other sections:
  - 1. Hollow metal doors, frames and silencers: Section 081113.
  - 2. Wood doors: Section 081416.
  - 3. Aluminum doors: Section 084113.

#### 1.2 DEFINITIONS

- A. "Finish Hardware" includes items known commercially as finish hardware which are required for swing, and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: Submit manufacturers technical product data for each hardware item. Include information necessary to show compliance with requirements and include instructions for installation and for maintenance of operating parts and finishes.
  - 1. Manufacturer shall submit written certification confirming closers compliance with U.L. 10C.
- B. Hardware Schedule: Submit a hardware schedule in a vertical format (horizontal format not acceptable), organized into sets, including the information below. Designations for door numbers and hardware sets in the schedule shall match those used in the Construction Documents for each opening.
  - 1. Hardware Schedule shall be coordinated with doors, frames, and related work to ensure proper size, thickness, hand function, and finish of door hardware.
  - 2. Catalog cuts of each type of exposed hardware unit, highlighted in color to indicate compliance with the Hardware Schedule.
  - 3. Type, style, function, size and finish of each hardware item.
  - 4. Name and manufacturer of each item.
  - 5. Fastenings and other pertinent information.
  - 6. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
  - 7. Mounting locations for hardware.
  - 8. Door and frame sizes and materials.
  - 9. Deviations from Specifications shall be noted in cover letter.
- C. 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. Keying Schedule: Submit separate detailed schedule, at the same time as the Hardware Schedule, indicating keying for all locks and how Owner's instructions, on keying of locks has been fulfilled. Keying schedule must be approved before ordering any locks.

- E. Pinning Transcript: Submit detailed schedule indicating each lock cylinder and core.
- F. 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.

#### 1.4 QUALITY ASSURANCE

- A. 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.
- B. Product/Material Qualifications: Manufacturer's product numbers are indicated for convenience in identifying finish hardware items. Unless otherwise indicated, manufacturer's description for indicated product number constitutes minimum standards of quality, design, function and performance required for each item to be incorporated into the Project.
  - 1. It will be the responsibility of the Bidder to furnish with his Bid a list clarifying any deviations from these specifications written or implied, in order that a fair and proper evaluation be made. Those Bidders not submitting a list of deviations will be presumed to have Bid as specified.
- C. Supplier Qualifications: A recognized Architectural Finish Hardware Supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years. Supplier shall be or employ an experienced Architectural Hardware Consultant (AHC) who is certified by and member of the Door and Hardware Institute. The Architectural Hardware Consultant shall be available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.
  - 1. Supplier shall meet with the Owner to finalize keying requirements and obtain final instructions in writing.
- D. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Pamphlets No. 80, No. 101 and of authorities having jurisdiction requirements. Provide only hardware which has been tested and listed by UL, FM or Warnock Hersey for types and sizes of doors required and complies with requirements of door and door frame labels.
  - 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware".
- E. Standards: Comply with the requirements of the latest edition of the following standards, unless indicated otherwise:
  - 1. American National Standards Institute (ANSI) Publications:
    - 1. A115 Series - Door and Frame Preparation.
    - 2. A156 Series - Hardware.
  - 2. Builders Hardware Manufacturers Association (BHMA) Publications:
    - 1. 1201 - Auxiliary Hardware.
    - 2. 1301 - Materials and Finishes.
  - 3. Door and Hardware Institute (DHI) Publications:
    - 1. Keying - Procedures, Systems, and Nomenclature.
    - 2. Abbreviations and Symbols.
    - 3. Hardware for Labeled Fire Doors.
    - 4. Recommended Locations for Builder's Hardware for Standard and Custom Steel Doors and Frames.
    - 5. Wood Door Standards W1, W2, WDHS-2, WDHS-3.
  - 4. National Fire Protection Association (NFPA) Publications:
    - 1. NFPA Pamphlet No. 80 - Standards for Fire Doors and Windows.
  - 5. International Building Code - current edition adopted.
  - 6. Americans with Disabilities Act (ADA).
- F. Keying Conference: Conduct conference in accordance with Section 013100. In addition to Owner, Construction Manager, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
  - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  - 2. Preliminary key system schematic diagram.
  - 3. Requirements for key control system.

4. Address for delivery of keys.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Section 013100 as follows:

1. Architectural Finish Hardware supplier (AFHS) shall conduct the preinstallation conference at the site. The AFHS shall instruct finish hardware installer on proper installation, adjustment and troubleshooting for each operable item of finish hardware specified. The AFHS shall observe the installation and adjustment of the first three locksets, closers and exit devices.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Package each hardware item in separate containers with all screws, wrenches, installation instructions and installation templates. Mark or tag each box with hardware heading and door number according to approved hardware schedule.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation. Provide a complete packing list showing items, door numbers and hardware headings with each shipment.
- D. Store hardware in shipping cartons above ground and under cover to prevent damage.
  1. Provide secure lockup for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.
- E. Aluminum Door Hardware: If required by door manufacturer deliver hardware for aluminum doors as directed by the door supplier for factory installation.

#### 1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system, as applicable.

#### 1.7 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

### PART 2 - PRODUCTS

#### 2.1 HARDWARE - GENERAL

- A. Provide the materials or products indicated by trade names, manufacturer's name, or catalog number.
- B. Provide manufacturer's standard products meeting the design intent of this Specifications, free of imperfections affecting appearance or serviceability.
  1. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.

2. Provide hardware complete with all fasteners, anchors, instructions, layout templates, and any specialized tools as required for satisfactory installation and adjustment.
  3. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
  4. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated or approved. Finish screws exposed under any condition to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as
  5. Finish all other hardware in accordance with the BHMA finish as follows, unless otherwise indicated in manufacturers screws to secure hardware.
  6. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where indicated otherwise or where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex bolt fasteners.
  7. Provide factory pinned cylinders and cores.
- C. Hardware is specified in the hardware schedule by set, type, and functions which have been selected as best meeting the application requirements. Acceptable products for each category are specified under PART 2 of this Specification.

## 2.2 SPECIAL REQUIREMENTS

- A. Hinges:
1. Provide non-removable pins for all exterior doors and out-swinging corridor doors. Use nonrising pins for all other doors.
  2. Pre-drill pilot holes for hinge fasteners at factory to suit hinge type.
  3. Provide continuous hinges where specified.
- B. Locksets:
1. Locksets shall meet or exceed ANSI A156.13-94, Grade 1 requirements.
- C. Panic Devices:
1. All panic devices shall have touchbars made of stainless steel, provide devices in stainless finish where specified.
  2. All latchbolts are to be deadlatching.
  3. Panic devices shall be through-bolted, using sex bolt fasteners.
  4. Exit devices are to incorporate a flush and tapered end cap.
  5. Hardware mullions are to be of the same manufacturer as the panic device. Provide keyed mullions unless otherwise specified. Provide mullion storage kits where specified.
  6. Except on fire-rated doors, or unless specified otherwise, provide panic devices with hex key dogging device to hold latch bolt open on doors with closers.
  7. Devices incorporating plastic dogging components will not be allowed.
  8. Provide electrical options as specified.
- D. Closers:
1. Comply with manufacturer's recommendations for unit size based on door size, weather exposure and usage.
  2. Through-bolt all closer units, using sex bolt fasteners.
  3. Provide parallel arms for all overhead closers, except as otherwise indicated.
  4. All surface closers shall exceed ANSI A156.4 Grade 1 requirements in all aspects as called for below. All closers shall have certification by an independent testing laboratory of 10,000,000 cycles without failure. Provide special rust inhibitive primer (SRI) where specified.
  5. Furnish all brackets, drop plates and any other necessary hardware required to insure proper installation.
- E. Stops
1. Provide heavy duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide overhead stop for interior doors that swing more than opens against equipment, casework, sidelights, and where conditions do not allow wall stop.
- F. Thresholds and Gasketing
1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.

2. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
3. Gasketing and astragals on aluminum frames by door manufacturer.

G. Silencers

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

## 2.3 KEYING

- A. Standard Lock Cylinders: BHMA A156.5; Grade 1 cylinders; face finished to match lockset.
- B. Key all locks separately, or alike, as directed by the Owner's representative and Architect. Provide keys as follows:
  1. Change Keys: Two (2) per lock.
  2. Master Keys: Six (6) required (per system).
- C. Existing Key System: Key cylinders to Owners existing master key system.
- D. All exterior doors to be keyed to Schlage Primus, interior doors to match existing keyway.
- E. Provide Schlage cylinders with large format interchangeable construction cores on all exterior openings.

## 2.4 KEY CONTROL SYSTEM

- A. Fire Department Access Boxes:
  1. Provide key lock boxes designed for storage of 2-5 keys. Manufactured by Knox Company or equal.
  2. Provide one lock box at exterior and provide one near elevators, if applicable.
  3. Locate in accordance with architectural detail. Where not specifically indicated, locate as directed by Architect.
  4. Provide surface mounted or recessed based on direction from Architect.

## 2.5 HARDWARE FINISHES

- A. Provide matching finishes for hardware units at each door to the greatest extent possible, unless otherwise indicated. In general, match items to the finish for the latch, lock or push-pull unit for color and texture.
  1. Product description or schedule:
    - 1) 626 satin chrome-plated.
    - 2) 630 satin stainless steel.

## 2.6 HARDWARE PRODUCTS

- A. Hinges:
  1. Specified manufacturer: IVES Hardware; an Allegion Company.
  2. Acceptable substitutions:
    1. Hager Companies.
    2. McKinney Products Company; an ASSA ABLOY Group company.
    3. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Continuous Gear-Type Hinges:
  1. Specified manufacturer: IVES Hardware; an Allegion Company.
  2. Acceptable substitutions:
    1. Hager Companies.
    2. McKinney Products Company; an ASSA ABLOY Group company.
    3. Select Products Limited.
- C. Locksets:
  1. Specified manufacturer: Schlage Commercial Lock Division; an Allegion Company.
  2. Substitutions: Not allowed. Products to match District standard.
- D. Exit Devices:
  1. Specified manufacturer: Von Duprin; an Allegion Company

2. Substitutions: Not allowed. Products to match District standard.
- E. Closers:
  1. Specified manufacturer: LCN Closers; an Allegion Company.
  2. Substitutions: Not allowed. Products to match District standard.
- F. Flatgoods:
  1. Specified manufacturer: Ives Hardware; an Allegion Company.
  2. Acceptable substitutions:
    1. Burns.
    2. Rockwood.
- G. Stops:
  1. Specified manufacturer: Ives Hardware; an Allegion Company.
  2. Acceptable substitutions:
    1. Burns Manufacturing Incorporated.
    2. Hager Companies.
    3. Rockwood Manufacturing Company.
    4. Trimco
- H. Overhead stops:
  1. Specified manufacturer: Glynn-Johnson; an Allegion Company.
  2. Acceptable substitutions:
    1. Architectural Builders Hardware Mfg., Inc.
    2. Door Controls International.
    3. Ives Hardware; an Allegion Company.
    4. Rixson Specialty Door Controls; an ASSA ABLOY Group.
- I. Thresholds:
  1. Specified manufacturer: Zero International
  2. Acceptable substitutions:
    1. Pemko Manufacturing Co.
    2. Reese Enterprises.
    3. National Guard Products.
- J. Door Gasketing/Weatherstripping:
  1. Specified manufacturer: Zero International
  2. Acceptable substitutions:
    1. Pemko Manufacturing Co.
    2. Reese Enterprises.
    3. National Guard Products.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Carefully inspect doors, frames, and conditions under which hardware will be installed. Notify the Architect of any conditions that would adversely affect the installation or subsequent door operations. Do not proceed until unsatisfactory conditions are corrected.
  1. Frames shall be verified, inspected, and confirmed by General Contractor as being plumb and true.
- B. Refer to Sections 081113, 081416, and 084113 for additional installation requirements.
- C. Prior to hardware installation, the Hardware Supplier shall meet with the Owner's Representative, Architect, and Hardware Installer to ensure the Installer has and understands the manufacturers' installation requirements for all hardware items.
  1. The Supplier shall observe the installation of the first lockset, closer and panic device.

### 3.2 INSTALLATION

- A. Mount Hardware units at heights indicated in respective DHI Standards, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

- B. Install each hardware item in compliance with the manufacturer's instructions and written recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be field finished, coordinate removal, storage and reinstallation or application of surface protections with finishing work. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
  - 1. Special care shall be taken to avoid damaging surrounding surfaces.
- D. Provide fasteners and anchoring devices of suitable size, quantity, and type to secure hardware in proper position for heavy use and long life.
  - 1. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Adjust door closers immediately upon installation. Adjust in exact conformance with manufacturer's printed instructions. Advance backcheck to eliminate shock at dead stop. Set latching speed to assure unassisted positive latching.
  - 1. Degrees of swing of doors for self-limiting closers shall be maximum available.
- F. Install each protection plate with a thinly-spread spot of mastic at its center to assure even contact before fastening with screws. Install all such plates on visual centers of closed doors. Set bottom edges of all such plates flush with door bottom.
- G. Cut and fit thresholds to door frame profiles. Prepare thresholds for the attachment of strikes and clearance for spindles as required. Set thresholds in a continuously laid bed of polyisobutylene mastic sealant to completely fill voids and exclude moisture from every source.
- H. Seal weather protection components attached to the exterior sides of doors and frames, such as drip caps and weatherstripping, in place with clear silicone caulk in such a manner as to ensure a continuously filled seam throughout the joinery.
- I. Cut and fit weatherstripping accurately to provide the greatest possible continuity of the contact element. Adjust closer templating as required.
- J. At exterior doors, obtain satisfactory operation of the installation, then apply a thin layer of clear silicone caulk under hinge leaves, and outside lock trim. Remove excess caulk after torqueing fasteners.

### 3.3 ADJUST AND CLEAN

- 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.
  - 1. Clean adjacent surfaces soiled by hardware installation.
- B. 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.

### 3.4 INSTRUCTION AND INSPECTION

- A. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
- B. After hardware is installed and adjusted, the Supplier shall inspect the job with the Architect and the Contractor to determine if the hardware is functioning properly.
  - 1. Maintain the instruction sheets, layout templates, and any supplementary literature regarding hardware in a readable condition. Transmit all such items to the Owner's Representative, together with all spare parts, specialized tools, other accessories supplied with the hardware, and a copy of the approved hardware schedule at the time of instruction.
- C. 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 Owner's 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 at no cost to the Owner. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

#### HARDWARE SETS

##### HARDWARE SET: 1

##### DOOR NUMBER:

1B201

##### EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY EPT	628	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU STOREROOM LOCK	ND80LDEU RHO RX CON 12V/24V DC	626	SCH
1	EA	K-I-L CYLINDER	23-065	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT	689	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT	689	LCN
1	EA	DOOR CONTACT	BY OWNER	BLK	SCE
1	EA	POWER SUPPLY	BY OWNER		
1		CARD READER	BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACCESS VIA VALID CARD READ OR REMOTE RELEASE AT DESK. ALWAYS FREE EGRESS.

##### HARDWARE SET: 2

##### DOOR NUMBER:

1B221A

##### EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80LD RHO	626	SCH
1	EA	K-I-L CYLINDER	23-065	626	SCH
1	EA	OH STOP	90S (AT D-A111 ONLY)	630	GLY
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	BLK	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

##### HARDWARE SET: 3

##### DOOR NUMBER:

1B112                      1B113                      1B210                      1B214

##### EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70LD RHO	626	SCH
1	EA	K-I-L CYLINDER	23-065	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

## HARDWARE SET: 4

## DOOR NUMBER:

1B202                      1B203                      1B211

## EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50LD RHO	626	SCH
1	EA	K-I-L CYLINDER	23-065	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HARDWARE SET: 5

## DOOR NUMBER:

1B112A                      1B206A                      1B209

## EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	KEYED PRIVACY W/INDICATOR	L9056L 06A L583-363 L283-722	626	SCH
1	EA	MORTISE CYLINDER	20-001	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

## HARDWARE SET: 6 - NOT USED

## HARDWARE SET: 7

## DOOR NUMBER:

1B208

## EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PRIVACY LOCK	ND40S RHO	626	SCH
		NOTE	REMAINDER OF HARDWARE EXISTING		

## HARDWARE SET: 8

## DOOR NUMBER:

1B206

## EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	ENTRANCE/OFFICE LOCK	ND50LD RHO	626	SCH
		NOTE	REMAINDER OF HARDWARE EXISTING		

**DOOR/HARDWARE SET INDEX**

DOOR #	HwSet #
1B112	3
1B112A	5
1B113	3
1B201	1
1B202	4

DOOR #	HwSet #
1B203	4
1B206	8
1B206A	5
1B208	7
1B209	5

DOOR #	HwSet #
1B210	3
1B211	4
1B214	3
1B221A	2

**END OF SECTION 087100**

## **SECTION 088000 - GLAZING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
    - a. Windows.
    - b. Doors.
    - c. Storefront framing.
  - 2. Glazing sealants and accessories.
  - 3. Glass types include:
    - a. Fully Tempered Monolithic Float Glass.
    - b. Fire Glazing.
      - 1) Fire protective glazing.
    - c. Specialty/Decorative Glass.
      - 1) Decorative Film Overlay.
- B. Related Requirements:
  - 1. Section 081113 "Hollow Metal Doors and Frames" for vision light glass in hollow metal frames and doors.
  - 2. Section 084113 "Aluminum Framed Entrances and Storefronts."
  - 3. Section 085613 "Transaction Windows."

#### **1.2 DEFINITIONS**

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass units.

#### **1.3 COORDINATION**

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### **1.4 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM E 119: Fire Tests of Building Construction and Materials.
- B. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings.
- C. Consumer Product Safety Commission (CPSC):
  - 1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials, Category II.

#### **1.5 PREINSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.
3. Review drawings for locations and details of glazing.

## 1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
  1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
  2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
  3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
  4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
  5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

## 1.7 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
  1. For security "forced entry resistant" glass, include UL listing verification and UL-752 Test Results.
  2. For security "forced entry resistant" glass, include manufacturer's written installation and cleaning instructions.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square. Submit the samples listing glass type corresponding to Glass Legend indicated on Drawings and as follows:
  1. Fire Glazing:
    - a. Fire-resistive glazing products.
    - b. Fire protective glazing products.
  2. Specialty Glass:
    - a. Decorative Film Overlay.
      - 1) Glazing Film Overlay Samples: Submit colored manufacturer's standard sample sets showing full range of colors available for each type and color indicated.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

## 1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For the following:
  1. Installers.
  2. Glass testing agency.
  3. Sealant testing agency.
- B. Product Certificates: For each type of glass and glazing product, from manufacturer. For glass.
- C. Product Test Reports: For glazing sealants, for tests performed by a qualified testing agency.
  1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.

## 1.9 CLOSEOUT SUBMITTALS

- A. Warranties: Sample of special warranties.

## 1.10 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- D. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- E. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- F. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F, and the fire-resistance rating in minutes.
- G. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Install glazing in mockups specified in related Sections indicated below to match glazing systems required for Project, including glazing methods.
    - a. Section 084113 "Aluminum-Framed Entrances and Storefronts".
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.11 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

## 1.12 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.
- B. Environmental Limitations for Fire Glazing: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during the remainder of the construction period.

## 1.13 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Warranty for Glazing Film Overlay: Manufacturer's standard form in which glazing film manufacturer agrees to replace glazing film units that deteriorate within specified warranty period. Deterioration of glazing film is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glazing film contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
  - 1. Warranty Period for Glazing Films: Five years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type
  - 1. Obtain tinted glass from single source from single manufacturer.
  - 2. Obtain laminated glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each laminated glazing type.
  - 3. Obtain decorative glazing film overlay from single source from single manufacturer for each product and installation method.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

### 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing. Design glass, including comprehensive engineering analysis according to the ICC's International Building Code (IBC) listed on Drawings and ASTM E 1300 by a qualified professional engineer, using design criteria set forth in Article 2.2 and as follows:
  - 1. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
  - 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
  - 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  - 2. For laminated-glass lites, properties are based on products of construction indicated.
  - 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  - 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.

5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
  6. Self-ignition temperature of 650 deg F or more when tested according to ASTM D 1929 on plastic sheets in thicknesses indicated for the Work.
  7. Smoke-Developed Index of 450 or less when tested according to ASTM E 84, or smoke density of 75 or less when tested according to ASTM D 2843 on plastic sheets in thicknesses indicated for the Work.
  8. Burning extent of 1 inch or less when tested according to ASTM D 635 at a nominal thickness of 0.060 inch or thickness indicated for the Work.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Glazing Manual."
  2. GANA Publications: "Laminated Glazing Reference Manual"
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the Safety Glazing Certification Council (SGCC) or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Fire-Resistive-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that the glazing is approved for use in walls, and the fire-resistance rating in minutes.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- E. Strength:
1. Where float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article.
  2. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article.
  3. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Fully-Tempered Monolithic Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- B. Glass Types: Refer to Glass Type Schedules at end of this Section.

## 2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
1. Construction: Laminated glass with the following interlayer types to comply with interlayer manufacturer's written instructions.
    - a. As required to provide fire resistive glass types or fire protective glass types indicated.
  2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
  3. Interlayer Color: Clear unless otherwise indicated.

4. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Laminated Glass Schedule" at end of this Section.

B. Glass Types: Refer to Glass Type Schedules at end of this Section.

## 2.6 FIRE-PROTECTIVE-RATED GLAZING

- A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.
  1. "W" denotes installed locations that must meet wall assembly criteria per ASTM E119.
  2. "OH" denotes installed locations that must meet fire window assembly criteria per NFPA 257.
  3. "D" denotes installed locations that must meet fire door assembly criteria per NFPA 252.
  4. "H" denotes installed locations that must meet fire door assembly hose stream test per NFPA 252.
  5. "T" denotes installed locations that must meet temperature rise requirement per NFPA 252.
- B. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II and ASTM E119. Label shall be/meet W120 in accordance with the latest edition of the International Building Code, as adopted by the authority having jurisdiction. Rating shall not be less than 2 hours (120 minutes).
  1. Basis-of-Design Product: Subject to compliance with requirements, provide Pilkington "Pyrostop", or comparable meeting specified requirements submitted to and accepted by Architect prior to bidding.
- C. Fire-Protective-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 257 or UL 9, including the hose-stream test, and shall comply with NFPA 80.
  1. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.
- D. Fire-Protective-Rated Tempered Glass: Min 6mm thickness, fire-protection-rated tempered glass; and complying with 16 CFR 1201, Category II.
- E. Film-Faced Ceramic Glazing: Clear, ceramic flat glass; 5-mm thickness; faced on one surface with a clear glazing film; and complying with 16 CFR 1201, Category II.
- F. Laminated Ceramic Glazing: Laminated glass made from two plies of clear, ceramic glass; 8-mm total thickness; and complying with 16 CFR 1201, Category II.
- G. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
- H. Double Glazing Units with Clear Gel Fill: Double glazing units made from two lites of uncoated, fully tempered, ultraclear float glass; with a perimeter edge seal enclosing a cavity filled with optically clear, intumescent gel; and complying with 16 CFR 1201, Category II.
- I. Glass Types: Refer to Glass Type Schedules at end of this Section.

## 2.7 SPECIALTY / DECORATIVE GLAZING

- A. Glazing Film Overlay (088000.A93): Glass with decorative adhesive-backed colored film overlay. Use dimensionally stable, optically clear polyester film with UV stable, pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.
- B. Glass Types: Refer to Glass Type Schedules at end of this Section.

## 2.8 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
  1. EPDM complying with ASTM C 864.

2. Silicone complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned EPDM or silicone gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
  1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.
- C. Fire-Rated Glazing: Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
  1. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
    - a. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

## 2.9 GLAZING SEALANTS

- A. General:
  1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  2. Provide glazing sealants that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
  3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
- C. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
  1. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

## 2.10 GLAZING TAPES

- A. General: Provide glazing tapes that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- C. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.11 MISCELLANEOUS GLAZING MATERIALS

- A. General:
  1. Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a

- 2. proven record of compatibility with surfaces contacted in installation.
  - 2. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

## 2.12 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
  - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.
  - 1. Provide ground and polished edges for glass doors and shelving at display cases.
  - 2. Provide ground and polished edges for glass shelving at merchandising walls.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Minimum required bite.
    - a. No less than 1/2" on all 4 sides.
  - 5. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
  - 1. Use methods approved by testing agencies that listed and labeled fire-resistive glazing or fire-protective glazing products.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.

- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

### 3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.7 GLAZING FILM OVERLAY INSTALLATION

- A. General: Comply with glazing film manufacturer's written instructions for preparation and installation.
  - 1. Apply squarely aligned to glass edges, uniformly smooth, and free from tears, air bubbles, wrinkles, and rough edges completely overlaying the back face of clean glass.
  - 2. Install film continuously in longest practicable lengths. Install with no gaps and no overlaps.
  - 3. If seamed, install with no gaps and no overlaps. Install seams vertical and plumb. Horizontal seams are not allowed.
  - 4. Delay removal of release liner from film until just before each piece of film is cut and ready for installation.
  - 5. Install film with mounting solution and custom cut to glass with neat, square corners and edges tight to window frame.
  - 6. Remove air bubbles, wrinkles, blisters and other defects, banding, thin spots and pinholes.
    - a. Where installed film does not meet this criteria, it shall be removed and replaced with new film.

### 3.8 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.
- F. Remove excess glazing film mounting solution at finished seams, perimeter edges and adjacent surfaces. Use cleaning methods recommended by glazing film manufacturer. Remove and replace films that cannot be cleaned.

### 3.9 HEAT TREATED MONOLITHIC GLASS SCHEDULE

- A. Glass **Type 11** - Clear Fully Tempered monolithic float glass (088000.A11):
  - 1. 1/4 inch (6 mm).
  - 2. Visible Light Transmittance: 85 percent minimum.
  - 3. Provide safety glazing labeling.

### 3.10 FIRE PROTECTIVE GLAZING SCHEDULE

- A. Glass Type 74 - Fire-Protective 20-Minute Rated Tempered Glass. (088000.A74)
  - 1. Glass Type 74.
  - 2. 1/4-inch-thick, fire-protection-rated tempered glass, complying with testing requirements in 16 CFR 1201 for Category II materials. Non-heat conductive and 20-minute rating minimum. Fire protective label per IBC shall be D-20.
  - 3. Basis of Design Products: Provide one of the following products:
    - a. Technical Glass Products; "Fireglass 20".
    - b. Safti First; "SuperLite I - 20".
    - c. McGrory Glass; "FireDefend 20".

### 3.11 SPECIALTY / DECORATIVE GLAZING

- A. Glazing Film Overlay (088000.A93 - **WF1**): Glass with decorative adhesive-backed colored film overlay. Use dimensionally stable, optically clear polyester film with UV stable, pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.
  - 1. Basis-of-Design Products: Subject to compliance with requirements, provide 3M.; "Fasara"; or a comparable substitute product submitted to and accepted by Architect prior to bidding.
    - a. Substitutions for convenience will not be considered after bidding.
  - 2. Film Finish: Frost/Matte - Opaque White (SH2MAOW).
  - 3. Film Thickness: 142 microns.
  - 4. Product Description: Single or multi-layered decorative film products, applied to interior glass surfaces, consisting of (from outboard surface to inboard surface):
    - a. Removable release liner.
    - b. Pressure sensitive adhesive with integral ultraviolet absorbers.
    - c. Dyed or printed pattern layer of polyester film.
  - 5. Use: Suitable for interior applications.
  - 6. Apply to Glass Type 11 where indicated on drawings.
  - 7. Accessories: Provide accessories complying with glazing film manufacturer's requirements for application indicated, with proven record of compatibility with surfaces contacted.
    - a. Adhesives: Pressure sensitive acrylic adhesive system.

- b. Cleaners, Primers and Sealers: Types recommended by glazing film manufacturer.

END OF SECTION

## SECTION 092116 - NON-STRUCTURAL METAL FRAMING

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Non-load-bearing steel framing systems for interior partitions (092116.A01).
  - 2. Suspension systems for interior ceilings, bulkheads, soffits, and exterior soffits.
    - a. For spans exceeding 8 feet in any direction refer to Section 054000 for design requirements.
  - 3. Grid suspension systems for gypsum board ceilings (092116.A06).
- B. Related Requirements:
  - 1. Section 012300 "Alternates" for description of alternates affecting work of this Section.
  - 2. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; and ceiling joists. In addition, for all interior soffits and ceilings with an unsupported span in any direction exceeding 8 feet.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Studs and Runners: Provide documentation that framing members' certification is according to SIFA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members."

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association or the Steel Stud Manufacturers Association.
- B. Evaluation Reports: For embossed steel studs and runners and firestop tracks, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

### 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 or where not specifically indicated, as specified below, according to ASTM E 119 by an independent testing agency acceptable to authorities having jurisdiction.
  - 1. Provide fire-resistance-rated assemblies identical to those specified by reference to design designations in UL "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction. Design designation from UL are minimum requirements. Where more stringent requirements are indicated or specified, the more stringent requirements shall take precedence.
    - a. One Hour non-load bearing partitions: UL U 465.
    - b. Two Hour non-load bearing partitions: UL U 411.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Horizontal Deflection: For wall assemblies, limited to 1/360 of the wall height based on horizontal loading of 5 lbf/sq. ft..

## 2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G40 or coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners (092116.A01): ASTM C 645. Use either steel studs and runners or embossed steel studs and runners.
  - 1. Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: 0.0179 inch.
    - b. Provide 0.0296 inch minimum base metal thickness for studs and runners at walls indicated to receive tile, walls indicated to receive abrasion-resistant drywall, impact-resistant drywall, and at other locations indicated.
    - c. Depth: 3-5/8 inches, unless otherwise indicated.
  - 2. Embossed Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: 0.0147 inch.
    - b. Provide 0.025 inch minimum base metal thickness for studs and runners at walls indicated to receive tile, walls indicated to receive abrasion-resistant drywall, impact-resistant drywall, and at other locations indicated.
    - c. Depth: 3-5/8 inches, unless specifically indicated otherwise.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
  - 1. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit over inside runner and one gauge heavier than gauge for wall construction indicated.
- D. Firestop Tracks: Top runner 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.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  - 1. Minimum Base-Metal Thickness: 0.0296 inch.
- F. Furring Channels (Furring Members) (09216.A03):
  - 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
- G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: 1-1/2 inches.
  - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels (092116.A02): ASTM C 645.
  - 1. Minimum Base-Metal Thickness: 0.0179 inch.
  - 2. Depth: 7/8 inch, unless specifically indicated otherwise.
- I. Z-Shaped Furring (092116.A04): With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

## 2.3 SUSPENSION SYSTEMS

- A. Hanger Attachments to Concrete:
  - 1. Anchors: Capable of sustaining a load equal to 5 times that imposed as determined by ASTM E488.
    - a. Type: Post installed, chemical anchor or post-installed, expansion anchor.
  - 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- C. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- D. Carrying Channels (092116.A05:) Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges, 3/4 inch deep. Hot-dip galvanize carrying channels in exterior locations to at least G40 requirements.
  - 1. Depth: 2 inches.
- E. Grid Suspension System for Gypsum Board Ceilings and Soffits (092116.A06): At Contractor's option, pre-manufactured grid suspension systems may be used. Grid suspension system shall comply with ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong World Industries, Inc; Drywall Grid Systems.
    - b. Chicago Metallic Corporation; 640/660 Drywall Ceiling Suspension.
    - c. United State Gypsum Company; Drywall Suspension System.
- F. Furring Channels (Furring Members) (09216.A03) :
  - 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
  - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
  - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- G. Hat-Shaped, Rigid Furring Channels (092116.A02): ASTM C 645, 7/8 inch deep.
  - 1. Minimum Base-Metal Thickness: 0.0179 inch.
- H. Z-Shaped Furring (092116.A04): With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

## 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Vertical Isolation Strips at Exterior Walls: Provide one of the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
- C. Isolation Strips beneath Runner Tracks at Exterior Walls: Provide the following:
  - 1. Polyethylene-sheet-backed rubberized asphalt membrane, 40 mils thick. Field cut to match widths of runners.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
  2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 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.

### 3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
  2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
  3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.
- 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. Where runner tracks for exterior walls are installed directly against concrete or dissimilar metals, install rubberized asphalt isolation strips between bottom of runner track and concrete.
- D. Install studs so flanges within framing system point in same direction.
- E. Install tracks (runners) 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 runner track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs, having a minimum base metal thickness of 0.0296 inches, at each jamb.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch 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.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- F. 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 o.c.
- G. 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 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 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 from corner and cut insulation to fit.
- H. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

### 3.5 INSTALLING SUSPENSION SYSTEMS

- A. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Hangers: 48 inches o.c.
  2. Carrying Channels (Main Runners): 48 inches o.c.
  3. Furring Channels (Furring Members): 16 inches o.c.
- B. 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.
- C. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

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## SECTION 092900 - GYPSUM BOARD

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Interior gypsum board.
    - a. Gypsum Board, Type X (092900.A02).
    - b. Mold-Resistant Gypsum Board (092900.A06).
  - 2. Tile backing panels (092900.A10).
  - 3. Expansion control joint (092900.A12).
  - 4. Sound attenuation blankets (092900.A14).
  - 5. Interior Wall-to-Mullion Sound Seal System (092900.A17).
- B. Related Requirements:
  - 1. Section 012300 "Alternates" for description of alternates effecting work of this Section.
  - 2. Section 092116 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
  - 3. Division 26 Sections for electrical connections to lighting components within trim pieces.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For the following products:
  - 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
- C. Samples for Verification: For the following products:
  - 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

#### 1.3 QUALITY ASSURANCE

- A. Integrated Field Sample: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Build integrated field sample for the following:
    - a. Each level of gypsum board finish indicated for use in exposed locations.
    - b. Each texture finish indicated.
  - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
  - 3. Simulate finished lighting conditions for review of mockups.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

### 2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

### 2.3 INTERIOR GYPSUM BOARD

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
  - 1. American Gypsum.
  - 2. CertainTeed Corp.
  - 3. Lafarge North America, Inc.
  - 4. National Gypsum Company.
  - 5. USG Corporation.
- B. Gypsum Board, Type X (092900.A02): ASTM C 1396/C 1396M.
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- C. Mold-Resistant Gypsum Board (092900.A06): ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
  - 1. Core: 5/8 inch, Type X.
  - 2. Long Edges: Tapered.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

### 2.4 TILE BACKING PANELS

- A. Cementitious Backer Units (092900.A10): ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following products or a comparable product, with the following product characteristics, submitted to and accepted by Architect prior to bidding.
    - a. C-Cure.; C-Cure Board 990
    - b. National Gypsum Company.; Permabase Cement Board.
    - c. USG Corporation.; DUROCK Cement Board.
  - 2. Thickness: 5/8 inch.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

### 2.5 TRIM ACCESSORIES

- A. Interior Trim (092900.A11): ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
  - a. At Contractor's option, interior trim may be a structural laminate drywall corner system using "No-Coat" products as manufactured by Certainteed or a comparable product submitted to and accepted by Architect prior to bidding.
2. Shapes:
  - a. Cornerbead.
  - b. L-Bead: L-shaped; exposed long flange receives joint compound.
  - c. J-Bead: J-shaped; exposed short flange does not receive joint compound.
  - d. Expansion (control) joint.
  - e. Wall end cap: Provide "Fast Cap" as manufactured by Trim-Tex Drywall Products.

## 2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  1. Interior Gypsum Board: Paper.
  2. Tile Backing Panels: As recommended by panel manufacturer.
  3. Cementitious Backer Units: As recommended by backer unit manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
  1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
  3. Fill Coat: For second coat, use drying-type, all-purpose compound.
  4. Finish Coat: For third coat, use drying-type, all-purpose compound.
  5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
    - a. Where specifically indicated on Drawings, provide a setting-type, sandable topping compound for trowel-applied skim coat.
- D. Joint Compound for Tile Backing Panels:
  1. Cementitious Backer Units: As recommended by backer unit manufacturer.

## 2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
  1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- E. Sound-Attenuation Blankets (092900.A14): ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
  2. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

- F. Acoustical Impaling clips (092900.A14): Galvanized sheet metal impaling clips each with 8 spikes that stick onto the fiberglass and hold the panel in place; 2-1/8" x 1-1/2"; install by either drywall screws or attached with adhesive as recommended by the manufacturer.
- G. Acoustical Joint Sealant (092900.A15): Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following products or a comparable product, with the following product characteristics, submitted to and accepted by Architect prior to bidding.
    - a. Accumetric LLC.; BOSS 824 Acoustical Sound Sealant.
    - b. Pecora Corporation.; AIS-919.
    - c. USG Corporation.; SHEETROCK Acousitical Sealant.
- H. Interior Wall-to-Mullion Sound Seal System (092900.A17 : Subject to compliance with requirements, provide "Mullion Mate - Series 30" by Gordon Incorporated or a comparable product submitted to and accepted by Architect prior to bidding with the following product characteristics:
  - 1. Size: Per opening/gap size as verified in field.
  - 2. Description: Extruded aluminum partition gap closure.
  - 3. Finish: Standard satin clear anodized.
  - 4. Acoustic Performance: STC of 39 minimum per ASTM E90.
  - 5. Fire Resistance: Class A per ASTM E84.
  - 6. Installation shall be friction fit as recommended by manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install

- sealant.
- 4. Where ceilings in showers abut adjacent walls, Provide 1/4- to 3/8-inch-wide spaces and trim edges with plastic edge trim to allow for sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Type X: Vertical and horizontal surfaces of walls, soffits, bulkheads and ceiling surfaces unless otherwise indicated.
  - 2. Impact-Resistant Type: Refer to Drawings for locations required.
  - 3. Tile Backing Panels: Restroom walls indicated to receive tile.
  - 4. Moisture and Mold Resistant Type X: Exterior walls and restrooms, except at walls indicated to receive tile. Restrooms and wet walls (such as behind electric drinking fountains, behind janitor's sink and sinks).
    - a. All other walls to receive moisture and mold resistant gypsum below 4 feet.
- B. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
  - 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
  - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
  - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
  - 3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
  - 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

### 3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11
  - 1. Locations:
    - a. At shower ceiling locations and vertical surfaces indicated to receive tile
    - b. At showers, tubs, and where indicated
    - c. At locations indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

### 3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners.
  - 2. L-Bead: Use where indicated.
  - 3. U-Bead: Use at exposed panel edges.
- D. Aluminum Trim: Install in locations indicated on Drawings.

### 3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in other Division 09 Sections.
  - 3. Level 5:
    - a. Provide at the following locations:
      - 1) At walls perpendicular to exterior glazing.
      - 2) Down Light / Wall Washers
      - 3) Where indicated on Drawings.
    - b. Primer and its application to surfaces are specified in Other Division 09 Sections.
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

## **SECTION 093000 - TILING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Ceramic and quarry tile (093000.A01).
  - 2. Glazed wall tile.
  - 3. Waterproof membrane.
  - 4. Crack isolation membrane.
  - 5. Metal edge strips (093000.A04).
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
  - 2. Section 092900 "Gypsum Board" for cementitious backer units.

#### **1.2 DEFINITIONS**

- A. General: Definitions in the ANSI A108 series of tile installation standards and, in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, ANSI A108.17, 108.18, 108.19, 108.20, A118, A136 which are contained in its "Specifications for Installation of Ceramic Tile."
- C. ANSI A 137.1, American National Standard Specifications for Ceramic Tile.
- D. ANSI A 137.2, American National Standard Specifications for Glass Tile.
- E. ANSI A 37.3, American National Standards Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile Panel/Slabs.
- F. Face Size: Actual tile size, excluding spacer lugs.
- G. Module Size: Actual tile size plus joint width indicated.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - 1. Level Surfaces: Minimum 0.60.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

1. Show extent and locations for waterproof membrane and crack isolation membrane.
- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
1. Full-size units of each type and composition of tile and for each color and finish required.
  2. Full-size units of each type of trim and accessory for each color and finish required.
  3. Metal edge strips in 6-inch lengths.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products.

## 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Tile and Trim Units: Furnish one unopened box, but not more than 2 percent, for each type, composition, color, pattern, and size indicated.

## 1.8 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
1. Crack isolation membrane.
  2. Joint sealants.
  3. Metal edge strips.
- D. Installer Qualifications:
1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
  2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
  3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
- E. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockup of each type of wall tile installation.
  2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- F. Mockups/Field Samples: Build mockups/field samples to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups/field samples of each type of **restroom wall tile installation**. Mockup/field sample shall extend to floor to demonstrate transition from wall to floor.
  2. Build mockups/field samples of each type of wall tile installation.

3. Approved mockups/field samples may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store liquid materials in unopened containers and protected from freezing.
- D. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

## 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  1. Level Surfaces: Minimum 0.60.
- B. Dynamic Coefficient of Friction: for tile installed on walkway surfaces, provide product with the following values as determined by testing identical products per ANSI A137.1.
  1. Level Surfaces: Minimum 0.42.

### 2.2 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type from single source or producer.
  1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
  1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
  2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
  1. Metal edge strips.

### 2.3 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  1. Provide tile complying with Standard grade requirements.
  2. Dynamic coefficient of Friction (DCOF) for Floor Tile: Greater than or equal to 0.42 per ANSI A137.1.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

## 2.4 CERAMIC TILE PRODUCTS

- A. Tile Type (093000.A01 – **T1**):
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile; "Classic - Color Wheel Collection," glazed ceramic wall tile.
    - a. Comparable products from other manufacturer's, meeting specified requirements, colors and shape, will be considered when submitted to and accepted by Architect prior to bidding.
  - 2. Composition: Glazed ceramic tile.
  - 3. Shape: Refer to Material Finish Legend.
  - 4. Size: Refer to Material Finish Legend.
  - 5. Thickness: 5/16 inch.
  - 6. Tile Color and Pattern: As indicated by manufacturer's designations on Material Finish Legend.
  - 7. Finish: Matte
  - 8. Grout Color: As selected by Architect from manufacturers full range.
  - 9. Grout Joint: 1/16 inch
  - 10. DCOF: ≥ 0.42 floors, N/A for walls.
  - 11. Performance Characteristics:
    - a. Water Absorption: ASTM C 373, <20%.
    - b. Breaking Strength: ASTM C 648, 120-230 lbs.
    - c. Scratch Hardness: MOHS, 4.0 - 6.0.
    - d. Chemical Resistance: ASTM C 650, Resistant.
- B. Tile Type (093000.A01 – **T2**):
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile; "Mosaics - Color Wheel Collection," glazed ceramic tile.
    - a. Comparable products from other manufacturer's, meeting specified requirements, colors and shape, will be considered when submitted to and accepted by Architect prior to bidding.
  - 2. Composition: Glazed ceramic tile.
  - 3. Shape: Rectangular, Herringbone Mosaic
  - 4. Size: 1 inch by 3 inch (9 inch by 12 inch sheet)
  - 5. Thickness: 1/4 inch.
  - 6. Tile Color and Pattern: As indicated by manufacturer's designations on Material Finish Legend.
  - 7. Finish Style: Accent
  - 8. Grout Color: As selected by Architect from manufacturers full range.
  - 9. Grout Joint: 1/8 inch
  - 10. DCOF: ≥ 0.42 floors, N/A for walls.
  - 11. Performance Characteristics:
    - a. Water Absorption: ASTM C 373, <3%.
    - b. Breaking Strength: ASTM C 648, >250 lbs.
    - c. Scratch Hardness: MOHS, 4.0 - 6.0.
    - d. Chemical Resistance: ASTM C 650, Resistant.

## 2.5 WATERPROOF MEMBRANE AND CRACK ISOLATION MEMBRANE (093000.A03)

- A. Fluid-Applied Waterproofing/Crack Isolation Membrane: Liquid-latex rubber or elastomeric polymer.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete; "Hydro Ban" waterproofing and crack isolation membrane. Comparable products from other manufacturers will be

- considered when submitted to and accepted by Architect prior to bidding.
- 2. Product Description and Characteristics:
  - a. Single component, self-curing liquid rubber polymer that forms a flexible and seamless membrane.
    - 1) Meets ANSI A118.10 - Membranes / Water Proofing and ANSI A118.12 - Membranes / Crack Isolation.
  - b. Thickness: Not less than 0.020 inches when cured.
  - c. Anti-fracture protection up to 1/8 inch.
  - d. Extra Heavy Service rating per TCNA.
- 3. Adhesives shall have a VOC content of 65 g/L or less.
- 4. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.6 SETTING MATERIALS

- A. Improved Modified Dry-Set Mortar (Thinset and LHT Mortars): ANSI A118.15.
  - 1. Provide prepackaged, dry-mortar mix containing dry, redispersable, vinyl acetate or acrylic additive to which only water must be added at Project site.
  - 2. For large & heavy tile (LHT) use mortar meeting LHT requirements.
  - 3. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.15.

## 2.7 GROUT MATERIALS

- A. High-Performance Polymer-Modified Tile Grout: Meeting or exceeding ANSI A118.7. Grout shall be chemical and stain resistant type. Polymer modified with ethylene vinyl acetate or acrylic additive, in dry, re-dispersible form, pre-packaged with other dry ingredients. Grout shall be fast setting, highly stain resistant, crack and shrink resistant, and mold /mildew resistant.
  - 1. Basis-of-Design Product: LATICRETE International, Inc., "Permacolor Grout" or comparable product from other manufacturers listed below, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
    - a. Ardex.
    - b. Bostik, Inc.
    - c. Custom Building Products.
    - d. MAPEI.
    - e. Mer-Kote Products, Inc.
    - f. Southern Grouts & Mortars, Inc.
    - g. Summitville Tiles, Inc.
    - h. TEC; a subsidiary of H. B. Fuller Company.
  - 2. Grout Color: As selected by Architect.
- B. Water-Cleanable High Performance Epoxy Grout: ANSI A118.3, with a working time not less than 80 minutes, equipped with anti-microbial technology and a full cure time of 14 days at 70 degrees F, and with a VOC content of 65 g/L or less.
  - 1. Basis-of-Design Product: LATICRETE International, Inc., "Spectralock PRO Grout" or comparable product from other manufacturers listed below, meeting specified requirements, submitted to and accepted by Architect prior to bidding.
    - a. Ardex.
    - b. Bostik, Inc.
    - c. Custom Building Products.
    - d. MAPEI.
    - e. Mer-Kote Products, Inc.
    - f. Southern Grouts & Mortars, Inc.
    - g. Summitville Tiles, Inc.
    - h. TEC; a subsidiary of H. B. Fuller Company.
  - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg. F. and 212 deg. F., respectively, and certified by manufacturer for intended use.
  - 3. Grout Color: As selected by Architect.

## 2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Trowelable Cementitious Coating for Walls: Powdered formulated made from special rapid-setting and hydrating binders, graded silica sand, synthetic resin, and special additives.
  - 1. Basis of Design Product: Subject to compliance with requirements provide "Ultratop Loft W" by Mapei.
    - a. Technical Data:
      - 1) Consistency: Fine powder.
      - 2) Color: White or Natural.
      - 3) Bulk Density: 900 Kg/m3.
      - 4) Dry solids content: 100%.
      - 5) Mixing ratio: approx. 32-35 parts of water per 100 parts of weight of Ultratop Loft W.
      - 6) Density of mix: 1,600 Kg/m3.
      - 7) PH of mix: 11.
    - b. Finish: In order to protect and made a non-absorbent surface, apply an undercoat of Ultratop Base Coat followed by a finishing product from the Manufacturer's floor finish range and as approved by Architect.
- C. Rapid Set Pre-Tiling Mortar: mortar shall be designed for both interior and exterior use and shall be non-sag type.
  - 1. Basis-of-Design Product: Ardex; "AM 100 Rapid Set" or comparable product submitted to and accepted by Architect prior to bidding.
  - 2. Locations for Use: Provide as a ¼ inch thick leveling mortar over interior concrete unit masonry walls indicated to receive tile.
- D. Metal Edge Strips (093000.A04): Profile as specified below, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring and wall applications; white zinc alloy or Type 316 L stainless-steel, ASTM A 666, 300 Series exposed-edge material. Provide Schluter profiles as follows:
  - 1. Type TR1: Schluter; "SCHIENE" satin anodized aluminum edge at all tile outside corners. Unless noted on the Material Finish Legend color shall be selected by Architect from manufacturers full range of options.
  - 2. Type TR3: Schluter; "Dilex EKE", satin anodized aluminum interior corner movement joint trim profile at all vertical inside wall corners of wall tile.
- E. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- F. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

## 2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
  - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
  - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  - c. Verify that protruding edges of concrete masonry units have been ground smooth and flush with plane of wall.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- C. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, pre-coat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

### 3.3 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
  1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors in wet areas.
    - b. Tile floors consisting of tiles 8 by 8 inches or larger.
    - c. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern:
  1. Lay tile in stacked grid pattern, unless otherwise indicated.
  2. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  3. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  4. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
  5. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Wall Tile (Tile Type T1): 1/16 inch.
  2. Wall Tile (Tile Type T2): 1/8 inch.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
1. Terminate top of wainscot decorative metal edge trim.
- G. All tile terminations that do not end in a corner will be capped with a metal edge trim.
- H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- I. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- J. Grout Sealer: Apply grout sealer to cementitious grout joints in the wainscot according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

### 3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
1. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

### 3.5 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
1. Allow crack isolation membrane to cure before installing tile or setting materials over it.

### 3.6 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove grout residue from tile as soon as possible.
  2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
  3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

### 3.7 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
1. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- B. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

### 3.8 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Wall Installations (except wet walls), Masonry or Concrete:
  - 1. Tile Installation: Thin-set mortar; TCNA W202I-18.
    - a. Thin-Set Mortar: Latex-portland cement mortar.
    - b. Grout: High performance grout.
- B. Interior Wall Installation (Wet Walls), Masonry or Concrete:
  - 1. Tile Installation: Thin-set mortar; TCNA W202I-18.
    - a. Thin-Set Mortar: Latex-portland cement mortar.
    - b. Grout: Water-cleanable epoxy grout.
- C. Interior Wall Installations (except wet walls), Metal Studs or Furring:
  - 1. Tile Installation: Thin-set mortar on cementitious backer unit; TCNA W202I-18
    - a. Thin-Set Mortar: Latex-portland cement mortar.
    - b. Grout: High performance grout.
- D. Interior Wall Installations (Wet Walls), Metal Studs or Furring:
  - 1. Tile Installation: Thin-set mortar on cementitious backer unit; TCNA W202I-18
    - a. Thin-Set Mortar: Latex-portland cement mortar over liquid waterproofing.
    - b. Grout: Water-cleanable epoxy grout.

END OF SECTION

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## **SECTION 095113 - ACOUSTICAL PANEL CEILINGS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Acoustical ceiling panels (095113.A01).
  - 2. Ceiling suspension systems (095113.A02).
- B. Related Requirements:
  - 1. Section 012300, "Alternates" for alternates effecting work of this section.
  - 2. Division 26 Sections for electrical requirements.

#### **1.2 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at Project site.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: One 6 inch square Sample of each type, color, pattern, and texture.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Suspended ceiling components.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Size and location of initial access modules for acoustical panels.
  - 4. Items penetrating finished ceiling including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Sprinklers.
    - e. Access panels.
  - 5. Perimeter moldings.
- B. Installer Qualifications: Submit written certification of compliance with requirements.
- C. Qualification Data: For testing agency.
- D. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.
- E. Product test reports.
- F. Field quality-control reports.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For finishes to include in maintenance manuals.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Panels: Furnish two, unopened boxes of each type installed.
  - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
  - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.
  - 4. Impact Clips: Equal to 2 percent of quantity installed.
  - 5. Single Tee Adapter Clips: Equal to 2 percent of quantity installed.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with not less than three years of successful experience in installation of acoustical ceilings similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.
- B. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Section 01 31 00.
- C. Testing Agency Qualifications: Qualified according to NVLAP.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

## 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  - 2. Smoke-Developed Index: 50 or less.

## 2.2 ACOUSTICAL PANEL CEILINGS, GENERAL

- A. Source Limitations:
  - 1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
  - 2. Suspension System: Obtain each type from single source from single manufacturer.
- B. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- C. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
  - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.
- D. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
  - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- E. Metal Suspension System Standard: Comply with ASTM C 635.

## 2.3 ACOUSTICAL PANELS (095113.A01)

- A. Recycled Content for Acoustical Panels: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product specified hereinafter or comparable product, meeting specified requirements, by one of the following:
  - 1. Acoustical Ceiling Units:
    - a. Armstrong World Industries, Inc.
    - b. Certainteed, Saint-Gobain.
    - c. USG Interiors, Inc.; Subsidiary of USG Corporation.
  - 2. Metal Suspension Systems, Edge Moldings and Decorative Edge Trim:
    - a. Armstrong World Industries, Inc.
    - b. Certainteed, Saint-Gobain.
    - c. Chicago Metallic Corporation.
    - d. Gordon, Inc.
    - e. USG Interiors, Inc.; Subsidiary of USG Corporation.
- C. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as specified.
- D. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

## 2.4 ACOUSTICAL CEILING PANELS

- A. Acoustical Ceiling Panel, (095113.A01 – **CLG1**): Provide medium textured, square edge lay-in, mineral fiber ceiling panels with the following characteristics:
  - 1. ASTM E 1264 Classification: Type III, Form 2, Pattern C E.
  - 2. Size: 24" x 48" x 7/8".
  - 3. Color: White.
  - 4. Average light reflectance (LR): 0.85.
  - 5. Noise reduction coefficient (NRC): 0.75.
  - 6. Ceiling attenuation class (CAC): 35, minimum.
  - 7. Flame Spread/Fire Resistance: Class A.

8. Antimicrobial: BioBlock+ or comparable from other listed manufacturers.
9. Humidity Resistance: HumiGuard+ or comparable from other listed manufacturers.
10. Product warranty: 30 years.
11. Suspension grid type: 15/16 (#2822).
12. Basis of Design Product: Provide Armstrong, "Fine Fissured High NRC" #1755 with 15/16" grid or comparable products from manufacturers listed in Article 2.3 of this Section.

## 2.5 METAL SUSPENSION SYSTEMS, GENERAL

- A. Recycled Content for Suspension Grid: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.
- B. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
  1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
  1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
    - a. Type: Post-installed expansion anchors.
    - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
  2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, provide not less than 0.106-inch-diameter wire.
- E. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For vestibule and corridor ceilings adjacent to exterior doors, provide hold-down clips spaced 2'-0" o.c. on all cross-tees for a radius of 10 feet from center of door.
- G. Impact Clips: In all toilet provide manufacturer's standard impact clip system design to absorb impact forces against lay-in panels.
- H. Hemmed Edge Molding: Provide prefinished edge molding of profiles indicated. Finish to match adjacent suspension grid.
- I. Fixture Trim: Provide manufacturer's standard fixture trim for fixtures within the 4 by 4 ceiling panels.
  1. Color to match suspension trim.

## 2.6 METAL SUSPENSION SYSTEM (095113.A02)

- A. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.
  1. Structural Classification: Intermediate-duty system.
  2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
  3. Face Design: Flat, flush.
  4. Cap Material: Steel cold-rolled sheet, except in kitchen and food preparation areas provide aluminum.

5. Cap Finish: As indicated on Material Finish Legend.
6. Basis of Design:
  - a. Armstrong "Prelude XL"

## 2.7 METAL EDGE MOLDINGS AND TRIM (095113.A03)

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
  1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
  2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
  3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

## 2.8 ACOUSTICAL SEALANT

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  1. Acoustical Sealant for Concealed Joints:
    - a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
    - b. Pecora Corporation; AIS-919.
    - c. Tremco, Inc.; Tremco Acoustical Sealant.
- B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  1. Concealed Joints: Nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
  1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  8. Do not attach hangers to steel deck tabs.
  9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.
1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.
- D. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.
- E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. At areas indicated, apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim, unless acceptable to Architect.
- F. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
  4. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For vestibule ceilings adjacent to exterior doors, provide hold-down clips spaced 2'-0" o.c. on all cross-tees for a radius of 10 feet from center of door.
  5. Impact Clips: In all toilet and locker rooms, provide manufacturer's standard impact clip system design to absorb impact forces against lay-in panels.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

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## **SECTION 096513 - RESILIENT BASE AND ACCESSORIES**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Resilient base (096513.A01).
  - 2. Resilient molding accessories (096513.A06).
  - 3. Metal transition strips.
- B. Related Requirements:
  - 1. Section 033000 "Cast-in-Place Concrete."

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturers' standard-size Samples, but not less than 12 inches long.

#### **1.3 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

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

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

#### **1.5 FIELD CONDITIONS**

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

## PART 2 PRODUCTS

### 2.1 THERMOPLASTIC-RUBBER BASE (096513.A01 – **RB1**)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Roppe; "700 Series" Wall Base or comparable products, meeting specified requirements, which are submitted to and accepted by Architect prior to bidding.
- B. Product Standard: ASTM F 1861, Type TP (thermoplastic).
  - 1. Group: I (solid, homogeneous).
    - a. Style: Match Existing.
- C. Product Characteristics:
  - 1. Thickness: 0.125 inch.
  - 2. Height: 4 inches as indicated on drawings.
  - 3. Lengths: Coils in manufacturer's standard length.
  - 4. Inside Corners: Job formed.
  - 5. Colors: Refer to Material Finish Legend for colors.

### 2.2 RUBBER MOLDING ACCESSORY (096513.A06)

- A. Description: Reducer strips for carpet to resilient flooring transitions, nosing for carpet, nosing for resilient flooring, joiner for tile and carpet, and transition strips.
- B. Locations: Provide rubber molding accessories in areas indicated.
- C. Colors and Patterns: As indicated by manufacturer's designations on Material Finish Legend.

### 2.3 METAL TRANSITION STRIPS

- A. Metal Transition Strips: Refer to details on drawings and Sheet A681 for manufacturers and types.
- B. ADA compliant. Maximum slope 1:2.
- C. Locations: Provide molding accessories and transitions in areas indicated.
- D. Colors and Patterns: As selected by Architect from manufacturer's full range.

### 2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and suitable for substrate conditions indicated.
  - 1. Adhesives shall have a VOC content of 50 g/L or less.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere

with adhesion of resilient products.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Miter or cope corners to minimize open joints.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### 3.5 METAL TRANSITION STRIP INSTALLATION

- A. Install metal transition strips where indicated. Securely anchor in place with mechanical fasteners as recommended by transition strip manufacturer.

### 3.6 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.
  - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

## **SECTION 096519 - RESILIENT TILE FLOORING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes resilient tile flooring (096519.A01) of the following types:
  - 1. Luxury vinyl floor tile.
  - 2. Rubber floor tile.
  - 3. Solid vinyl floor tile.
  - 4. Sheet resilient athletic turf flooring.
- B. Related Sections:
  - 1. Section 012100 "Allowances" for allowances effecting work of this Section.
  - 2. Section 012200 "Unit Prices" for unit prices effecting work of this Section.
  - 3. Section 012300 "Alternates" for alternates effecting work of this Section.
  - 4. Section 033000 "Cast-in-Place Concrete" for integral moisture vapor sealing admixture.
  - 5. Section 096513 "Resilient Base and Accessories" for related base and floor transitions.
  - 6. Section 096813 "Tile Carpeting" for related flooring.
  - 7. Section 142400 "Hydraulic Elevators" for flooring installation.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 1. Floor patterns and transition strip locations.
  - 2. Layout, colors, widths, and dimensions of game lines and markers.
  - 3. Seam locations for sheet flooring.
- C. Samples for Verification: Samples: For each exposed product and for each color and texture specified in manufacturer's standard size, but not less than 6-by-9-inch sections.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data:
  - 1. For qualified flooring Installer.
  - 2. For qualified flooring manufacturer.
- B. Preparation and Installation Guidelines: For each type of resilient flooring, including current subfloor preparation guidelines in addition to installation guidelines published by flooring manufacturer.
- C. Slab Moisture Testing Results: Refer to Part 3 of this Section.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.
- B. Warranty:
  - 1. Manufacturer material warranty.
  - 2. Installer installation warranty.

## 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish one un-opened box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. ISO 9001 Certified.
  - 2. ISO 14001 Certified.
  - 3. At least ten years active experience in the manufacture and marketing of indoor resilient flooring.
  - 4. A provider of authorized installer training.
  - 5. Must be competent in techniques required by manufacturer for resilient flooring installation indicated.
- B. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required and shall have at least five years' experience.
- C. Mockups/Field Samples: Build mockups/field samples to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups/field samples for floor tile including resilient base and accessories.
    - a. Size: Minimum 50 sq. ft. for each type, color, and pattern in locations directed by Architect.
  - 2. Approval of mockups/field samples does not constitute approval of deviations from the Contract Documents contained in mockups/field samples unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Fire Test Characteristics: As determined by testing identical products according to ASTM E 648, Class 1, by a qualified testing agency acceptable to authorities having jurisdiction.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.
- B. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

## 1.8 FIELD CONDITIONS

- A. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
  - 1. After post-installation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F or more than 95 deg F.
  - 2. Close spaces to traffic during flooring installation.
  - 3. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.
- B. Install floor tile after other finishing operations, including painting, have been completed.

## 1.9 WARRANTY

- A. Special Limited Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace resilient flooring that fails within specified warranty period.
  - 1. Material warranty direct from the product manufacture and not a separate or third party insurance provider.
  - 2. Failures include, but are not limited to, the following
    - a. Material manufacturing defects.
    - b. Surface wear and deterioration to the point of wear-through.
    - c. Failure due to substrate moisture exposure not exceeding 5 pounds moisture vapor emission rate when tested according to ASTM F 1869, and 80 percent relative humidity when tested according to ASTM F 2170.
  - 3. Warranty Period:
    - a. For materials: 2 years from date of Substantial Completion.
    - b. For surface wear: 15 years from date of Substantial Completion.
- B. Special Limited Warranty: Installer's standard form in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within the specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

### 2.2 LUXURY VINYL FLOOR TILE (096519.A01 – **RF1**)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide "Brushed Lines" by Interface. Comparable products from other manufacturers will be considered, which match color and pattern selected to Architect's satisfaction and, are submitted to and accepted by Architect prior to bidding.
  - 1. Tile Standard: ASTM F 1700.
    - a. Class: Class III, printed film vinyl tile.
  - 2. Product Characteristics:
    - a. Thickness: 4.5 mm.
      - 1) Wear layer thickness 22 mil.
    - b. Size: 9.845 inches by 39.38 inches.
  - 3. Performance Characteristics:
    - a. Static Load Limit: Passes, modified at 1,500 psi when tested according to ASTM F 970.
  - 4. Colors and Patterns: As indicated by manufacturer's designations on Material Color Schedule.

### 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by tile flooring and adhesive manufacturers for each type of tile flooring. Adhesive shall be suitable for substrate conditions involved and compatible with flooring.
  - 1. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. LVT with Quick Stick pre-applied adhesive – 99% R.H., MVER 18, pH12.

- D. Topical Concrete Vapor Sealer: Liquid penetrating type or film-forming type, designed to seal concrete and inhibit moisture transmission through slab. Concrete vapor sealers shall be as recommended by resilient tile flooring contractor based upon successful previous installations and as acceptable to resilient tile flooring manufacturer. Refer to Section 012200 "Unit Prices".
- E. Transition Strips: Refer to details on drawings and Sheet A681 for manufacturers and types.
- F. Metal Transition Strips: Provide pre-manufactured transition strips as indicated on Sheet A681, in manufacturer's standard lengths and in longest lengths practical.
  - 1. Basis-of-Design: Product: Provide Gradus "TT35/AFT15" at transitions to carpet, resinous flooring, or vct. Comparable products matching profile and characteristics of specified product will be considered.
    - a. Transition Strip: Provide pre-manufactured two-piece edging.
    - b. Material: PVC-u top and aluminum base.
    - c. Overall Height: 10 mm.
    - d. Width: Top - 35 mm, base - 16 mm.
    - e. Color: As selected from manufacturers full range.
  - 2. Fasteners: Provide post-installed expansion anchors with Type 304 stainless steel countersunk fasteners.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by carpet tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by carpet tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing (Contractor's Option):
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours, unless a higher rate is accepted by flooring manufacturer in writing.
      - 1) Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
    - b. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement, unless a higher rate is acceptable to flooring manufacturer.
- C. Concrete Vapor Sealer Application: Prepare surfaces to receive concrete vapor sealer and apply concrete vapor sealer in strict accordance with vapor sealer manufacturer's written instructions to suit slab moisture conditions encountered.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate according to manufacturer's written instructions.

1. Fill cracks 1/8 inch wide and wider, fill and level holes and depressions 1/4 wide or wider and grind level all protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- E. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
- F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

### 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
1. Lay tiles square with room axis, unless specifically indicated otherwise.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
1. Floor tile pattern as indicated on drawings.
  2. Lay luxury vinyl tiles with grain running in one direction.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
1. Remove adhesive and other blemishes from exposed surfaces.
  2. Sweep and vacuum surfaces thoroughly.
  3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.
- D. Floor Polish for Vinyl Composition Floor Tile: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
1. Apply two coats minimum.
- E. Cover floor tile until Substantial Completion.

END OF SECTION

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## **SECTION 096723 - RESINOUS FLOORING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes seamless resinous flooring systems (096723.A01) with integral base (096723.A02).
- B. Related Sections:
  - 1. Section 012200 "Unit Prices" for waterproofing membrane.
  - 2. Section 096513 "Resilient Base and Accessories".

#### **1.2 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
    - a. Review delivery, storage, and handling procedures.
    - b. Review ambient conditions and ventilation procedures.
    - c. Review subfloor preparation procedures.
    - d. Review layout and patterns.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required; in addition to the following:
  - 1. List each material and cross-reference the specific coating, finish system and application. Identify each material by manufacturer's catalog number and general classification.
  - 2. Laboratory Test Reports: For resinous flooring systems, documentation indicating that products comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers".
- B. Samples for Verification: Prior to beginning work, submit samples for each resinous flooring system color, texture and sheen required and as follows:
  - 1. Samples shall be 6 inches square, applied to a rigid backing by Installer for this Project.
  - 2. Resubmit samples as requested until required sheen, color and texture is acceptable to Architect.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Installer Certificates: Submit certificates signed by manufacturer certifying that installers comply with specified requirements, in addition to the following:
  - 1. Submit substantiating evidence of experience installing the specific brand of products proposed in similar areas, in addition to meeting Installer Qualification criteria.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

#### **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an Installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated. Installer shall be/have been trained by flooring system manufacturer with experience in application and installation of systems similar in complexity to those required for this project, in addition to the following:

1. Installer shall have a minimum of two (2) years continuous experience under the current company name.
  2. Installer shall submit a reference list of at least three (3) projects, similar in size and applied system(s), completed in the states of Missouri. Include contact information for General Contractor or Construction Manager and Owner. List types and names of systems installed, each material/component of system(s) installed, quantity installed and dates completed.
- B. Mockups/Field Samples: Build mockups/field samples to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups/field samples in conjunction with the wall tile mock-up installation. Mockup/field sample shall extend to floor to demonstrate transition from wall to floor.
  2. Approved mockups/field samples may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components. Include handling instructions and precautions.
- B. Store materials not in actual use in tightly covered containers at a minimum ambient temperature of 45 deg F in a well-ventilated area. Maintain containers in clean condition, free from foreign material and residue.
1. Protect liquid components from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary precautionary measures to ensure workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of floor systems.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
1. Do not commence work until the building can be maintained at a temperature range between 60 deg F and 90 deg F for 48 hours before, during and 48 hours after application. Broom clean areas (reasonably dust free) and have adequate controlled ventilation.
  2. Maintain ventilation in each area indicated to receive resinous flooring until completion of the resinous flooring work in that area.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.
- D. Surfaces to receive resinous flooring must be acceptable and in accordance with flooring system manufacturer's recommendations.
1. Provide clean, dry, and neutral substrate for resinous flooring application.
  2. Notify Owner's Representative in writing of unsuitable surfaces and conditions. Commencement of work implies acceptance of surfaces and working conditions.

#### 1.9 PROTECTION

- A. Protect adjacent surfaces from damage resulting from work of this trade. If necessary, mask and/or cover adjacent surfaces, fixtures, cabinetry, equipment, etc. by suitable means.
- B. Post "NO SMOKING" signs while work is in progress and during curing.

## 1.10 SPECIAL WARRANTY

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Flammability: Self-extinguishing according to ASTM D 635.
- C. Slip Resistance: Resinous flooring surfaces shall have the following minimum performance requirements as indicated below.
  - 1. Static Dry Coefficient of Friction: 0.6 minimum per ASTM D2047.
  - 2. Dynamic Wet Coefficient of Friction: 0.45 minimum per ANSI A326.3 or ANSI B101.3.

### 2.2 MANUFACTURERS

- A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, body coats, and topcoats, from single source from single manufacturer to ensure material compatibility, chemical and mechanical bond; quality of materials, color and pattern consistency. Obtain secondary materials, including patching and fill material, color chips/flakes and granules, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

### 2.3 RESINOUS FLOORING (096723.A01 – ***FT1, FT2***)

- A. Basis-of-Design Product: Subject to compliance with specified requirements, provide DESCO Coatings, Inc; "Cremona TG" with aliphatic urethane topcoat, resinous flooring system or one of the resinous flooring systems listed below.
  - 1. Dur-A-Flex; "DUR-A-Quartz Q11" with aliphatic urethane topcoat.
  - 2. Stonhard; "Stonetec ERF" with aliphatic urethane topcoat.
  - 3. Sherwin-Williams Resuflor Quartz TQ with aliphatic urethane topcoat.
  - 4. Tnemec; Series 223 "DECO-Trowel" with aliphatic urethane topcoat.
  - 5. Comparable products from manufacturers listed below and other manufacturers which meet or exceed specified requirements will also be considered when submitted to and accepted by Architect as a substitution prior to bidding only.
- B. Resinous Flooring System: System shall be a trowel-applied, abrasion-, UV-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base. System shall be capable of being applied over an existing epoxy resinous floor.
- C. System Characteristics:
  - 1. Color and Patterns: As noted on Material Finish Schedule.
  - 2. Wearing Surface: Orange-peel texture to match approved sample.
    - a. Slip resistance shall not be less than performance requirements indicated in this Section.
  - 3. Overall System Thickness: Not less than 3/16 inch.
- D. Primer: Provide manufacturer's recommended primer to suit substrate and resinous flooring system indicated.
  - 1. Formulation Description: 100 percent solids.
- E. Body Coats:
  - 1. Resin: Epoxy.
  - 2. Formulation Description: 100 percent solids.
  - 3. Type: Clear or colored to suit design mix selected.
  - 4. Application Method: Self-leveling slurry with broadcast aggregates.

5. Aggregates: Colored quartz (ceramic-coated silica).
  - a. Quartz aggregate shall be Grade 11.
- F. Topcoats: Sealing or finish coats.
  1. Resin: Aliphatic Urethane.
  2. Formulation Description: High solids.
  3. Type: Clear.
  4. Number of Coats: As required to achieve overall system thickness specified and texture selected.
  5. Finish Texture and Sheen: Match sample approved by Owner's Representative.
- G. Integral Cove Base: Provide integral coved base of height indicated with 1 inch radiused cove and bullnosed top edge termination. Provide keyed joint where resinous flooring terminates with other materials.
- H. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
  1. Compressive Strength (Binder): 14,000 psi minimum according to ASTM D 695.
  2. Compressive Strength (System): 10,000 psi minimum according to ASTM C 579.
  3. Tensile Strength: 2,250 psi minimum according to ASTM C 307.
  4. Bond Strength: 400 psi minimum according to ASTM D 4541.
  5. Water Absorption: 0.04 percent maximum according to ASTM D 570.
  6. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch permanent indentation according to MIL-D-3134J.
  7. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch according to MIL-D-3134J.
  8. Abrasion Resistance: 80 mg maximum weight loss according to ASTM D 4060.
  9. Hardness: 75-80 Shore D according to ASTM D 2240.
  10. Flame Spread/NFPA 101: Class A according to ASTM E 84.
- I. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested according to ASTM D 1308 for 50 percent immersion in the following reagents for no fewer than seven days:
  1. Bleach (3%).
  2. Coffee.
  3. Hydro peroxide (3%).
  4. Nitric acid (10%).
  5. Phosphoric acid (20%).
  6. Sodium hydrate (40%).
  7. Urine.

## 2.4 ACCESSORIES

- A. Reinforcing Membrane: Flexible resin formulation that is recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated and that inhibits substrate cracks from reflecting through resinous flooring.
  1. Formulation Description: Manufacturer's standard high solids.
    - a. Provide fiberglass scrim embedded in reinforcing membrane.
- B. Metal Transition Strips: Provide pre-manufactured aluminum edging, 1/8 inch high by 2 inches wide in manufacturer's standard lengths and in longest lengths practical.
  1. Basis-of-Design Product: National Guard Products; Model 8132 "Heavy Duty Aluminum Transition Strip". Comparable products matching profile and characteristics of specified product will be considered.
  2. Basis-of-Design Product: Schluter Systems; "RENO-Ramp". Comparable products matching profile and characteristics of specified product will be considered.
  3. Fasteners: Provide post-installed expansion anchors with Type 304 stainless steel countersunk fasteners.
    - a. Provide all fasteners and accessories necessary for secure and proper installation.
- C. Transition Strip: Provide pre-manufactured two-piece edging.
  1. Basis-of-Design Product: Gradus "TT35/AFT15". Comparable products matching profile and characteristics of specified product, or as indicated on Sheet A681 will be considered.
    - a. Material: PVC-u top and aluminum base.
    - b. Overall Height: 10 mm.
    - c. Width: Top - 35 mm, base - 16 mm.
    - d. Color: As selected from manufacturers full range.

- e. Fasteners: Provide post-installed expansion anchors with Type 304 stainless steel countersunk fasteners.
    - 1) Provide all fasteners and accessories necessary for secure and proper installation.
- D. At top of resinous wall base provide the following product. Colors shall match existing at project site as determined by Architect. Height of trim shall match thickness of resinous flooring system.
  - 1. Basis of Design Product: "Jolly" by Schluter.
- E. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- F. Joint Sealant: Type recommended or produced by manufacturer of resinous flooring system for type of service and joint condition indicated.
- G. Waterproofing Membrane: When required by manufacturer for a successful installation over project site conditions, provide and install a fluid applied moisture barrier membrane, to prevent excessive moisture/humidity conditions, allowing a fully warranted floor installation.
  - 1. Vapor barrier to allow 100% relative humidity at the floor surface, while maintaining the manufacturer's full warranty.
  - 2. Refer to Section 012200 "Unit Prices".

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Contractor shall examine subfloor surfaces to verify all substrates and conditions are satisfactory. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, curing compounds, and other adhesives and coatings that may inhibit bonding capability of resinous flooring and primer, as well as other defects that may impair performance and appearance.

### 3.2 PREPARATION

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
  - 1. Areas where flooring is existing, must be cleaned to remove all floor material, adhesives, grease or any residue that may interfere with interfacial adhesion between substrate and new resinous flooring system.
  - 2. Prepare concrete substrates by shot blasting or grinding to achieve surface profile recommended by resinous flooring manufacturer.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, adhesives, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Roughen concrete substrates as follows:
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
  - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
  - 3. Moisture testing is not required. However, Contractors at their own expense may, as they deem necessary, verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
    - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
    - b. Relative Humidity Test: Use in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement.
  - 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- E. Metal Transition Strips: Install at locations indicated and between resinous flooring and concrete. Transition strip may be used as a screed. Thicken resinous flooring application as necessary so flooring is flush with top of transition strip. Installation shall be in strict accordance with edging manufacturer's written recommendations.

### 3.3 APPLICATION

- A. Proceed with resinous flooring work after subfloor surfaces are satisfactory. Commencement of resinous flooring work is construed as Installer's acceptance of substrate surfaces within a particular area.
  1. Coordinate work within this section with adjacent finish work to achieve full coverage of each finish as required by each section.
- B. Apply components of resinous flooring system according to manufacturer's latest written instructions, employing technically-trained, approved mechanics, to produce a uniform, monolithic wearing surface of thickness indicated.
  1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
  3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
    - a. Do not fill moving isolation joints or expansion joints.
    - b. At movement joints, provide membrane isolation strips and reinforcing tape as recommended by resinous flooring manufacturer.
- C. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- D. Reinforcing Membrane: Apply reinforcing membrane to substrate cracks.
  1. Fill non-moving control joints with approved elastomeric sealant or full-depth semi-rigid two-component epoxy joint filler, designed specifically for this purpose (use full-depth semi-rigid joint filler when reinforcement of the joint edge is desirable), or two-component epoxy and filler (epoxy to be same material as flooring).
- E. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended by manufacturer.
- F. Grout Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.
- G. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.
- H. Cure resinous flooring in compliance with flooring manufacturer's directions to prevent contamination during all stages of application.
- I. Finish work shall match approved samples; be uniform in thickness, sheen, color and texture; and be free of defects detrimental to appearance and performance.
- J. Install metal transition strips where resinous flooring abuts other flooring materials. Securely anchor in place with mechanical fasteners as recommended by transition strip manufacturer.

### 3.4 FIELD QUALITY CONTROL

- A. Material Sampling: Owner's Representative may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.
  1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.

2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
  3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.
- B. Core Sampling: At the direction of Owner's Representative and at locations designated by Owner's Representative, take one core sample per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.
- C. Touch-up or repair damaged coatings. Touch-up shall not be visibly different. Recoat entire surface if touch-up results are visible, either in sheen, texture or color.

### 3.5 CLEANING AND PROTECTION

- A. Clean resinous flooring prior to Substantial Completion. Use materials and procedures recommended by resinous flooring manufacturer.
- B. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.
1. Remove any temporary covering prior to cleaning and final inspection.

END OF SECTION

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## **SECTION 096813 - TILE CARPETING**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section includes modular carpet tile (096813.A01).
- B. Related Requirements:
  - 1. Section 012200 "Unit Prices" for waterproofing membrane.
  - 2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

#### **1.2 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
    - a. Review delivery, storage, and handling procedures.
    - b. Review ambient conditions and ventilation procedures.
    - c. Review subfloor preparation procedures.
    - d. Review carpet tile layout and patterns.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
  - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show the following:
  - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
  - 2. Type of substrate to receive tile carpeting.
  - 3. Type of installation.
  - 4. Pattern of installation.
  - 5. Pattern type, location, and direction.
  - 6. Carpet tile type, color and dye lot.
  - 7. Type, color and location of insets and borders.
  - 8. Type, color and location of edge, transition, and other accessory strips.
  - 9. Transition details to other flooring materials.
- C. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
  - 1. Carpet Tile: Full-size Sample.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- E. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet Tile: Furnish one un-opened box of each carpet tile type, color and pattern for every 5 percent of amount installed.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.
- C. Mockups/Field Samples: Build mockups/field samples to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockups/field samples for carpet tile including accessories.
    - a. Size: Minimum 50 sq. ft. for each type, color, and pattern in locations directed by Architect.
  - 2. Approval of mockups/field samples does not constitute approval of deviations from the Contract Documents contained in mockups/field samples unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

## 1.9 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

## 1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
  - 3. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 CARPET TILE (096813.A01)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products specified on drawings or a comparable products meeting specified requirements, having similar colors and patterns as acceptable to Architect with the following characteristics submitted to and accepted by Architect prior to bidding.
- B. Carpet Type **C1**: Subject to compliance with requirements, provide "Side Stripe" #GT419 by Mohawk Group.
1. Product Construction: Tufted.
  2. Fiber Type: Duracolor Tricor Premium Nylon
  3. Surface Texture: Textured Patterned Loop
  4. Dye Method: Solution Dyed
  5. Face Weight: 17 oz/yd<sup>2</sup>.
  6. Pile Density: 6,000 oz/yd<sup>3</sup>.
  7. Stiches: 12.4 per inch.
  8. Radiant Panel: ASTM E-648 Class 1.
  9. Smoke Density: ASTM E-662 ≤ 450.
  10. Primary Backing: Synthetic – EcoFlex One
  11. Soil / Stain Protection: Manufacturer's standard with warranty.
  12. Size: 24 inches by 24 inches
  13. Color and Pattern: As indicated on Material Finish Legend.
  14. Installation Method: Brick Ashlar, Horizontal 1/2 overlap.
- C. Carpet Type **C1a**: Subject to compliance with requirements, provide "Speak Your Language - Speak In Color" #I0239 by Patcraft.
1. Product Construction: Multi-Level Pattern Loop
  2. Fiber Type: EcoSolution Q100 Nylon
  3. Dye Method: 100% Solution Dyed
  4. Tufted Yarn Weight: 18 oz/yd<sup>2</sup>.
  5. Finished Pile Thickness: 0.09 inches.
  6. Pile Density: 7,200 oz/yd<sup>3</sup>.
  7. Stiches: 10 per inch.
  8. Radiant Panel: ASTM E-648 Class 1.
  9. Smoke Density: ASTM E-662 ≤ 450.
  10. Primary Backing: Synthetic – Non-Woven Synthetic
  11. Secondary Backing: EcoWorx Tiel
  12. Soil / Stain Protection: Manufacturer's standard with warranty.
  13. Size: 24 inches by 24 inches
  14. Color and Pattern: As indicated on Material Finish Legend.
  15. Installation Method: Match existing install pattern.
- D. Carpet Type **C1b**: Subject to compliance with requirements, provide "Crayon" #01957 by Tarkett.
1. Product Construction: Tufted.
  2. Fiber Type: Dynex SD Nylon/Dynex Nylon
  3. Surface Texture: Level loop pile.
  4. Dye Method: Solution Dyed/Yarn Dyed
  5. Face Weight: 18 oz/yd<sup>2</sup>.
  6. Pile Thickness: 0.085 inches.
  7. Pile Height: 0115 inches
  8. Pile Density: 2,983.5 oz/yd<sup>3</sup>.
  9. Stiches: 8.5 per inch.
  10. Radiant Panel: ASTM E-648 Class 1.
  11. Smoke Density: ASTM E-662 ≤ 450.
  12. Primary Backing: Synthetic Non-woven.
  13. Soil / Stain Protection: Manufacturer's standard with warranty.
  14. Size: 24 inches by 24 inches
  15. Color and Pattern: As indicated on Material Finish Legend.
  16. Installation Method: Match existing install pattern.

- E. Carpet Type **C1C**: Provided from Owner's tile cartpet Stock.Contractor to install as recommended by manufacturer.

## 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type. Select adhesives suitable for substrate conditions and compatible with flooring and backing. Adhesives shall comply with flammability requirements for installed carpet tile and be recommended by carpet tile manufacturer for releasable installation.
  - 1. Adhesives shall have a VOC content of 50 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Adhesive Tape: Tile Carpeting manufacturer's recommended adhesive tape or dot system to suit backing type and substrates involved.
- D. Resilient Transition Strips: Refer to Section 096513 "Resilient Base and Accessories" and Interior Material Finish Legend for information and products for use at carpet transitions.
- E. Metal Edge/Transition Strips: Extruded aluminum with anodize aluminum finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
  - 1. For carpet to concrete, provide pre-manufactured aluminum edging, 3/8 inch high by 2-1/2 inches wide in manufacturer's standard lengths and in longest lengths practical.
    - a. Basis-of-Design Product: National Guard Products; Model 417 "Aluminum Carpet Edging". Comparable products matching profile and characteristics of specified product will be considered when submitted to and accepted by Architect prior to bidding. Color and textures shall be as selected by Architect from manufacturer's full range of custom options.
  - 2. For carpet to resinous flooring and carpet to resilient sheet vinyl transitions, provide pre-manufactured transition strips as indicated on Sheet A681, in manufacturer's standard lengths and in longest lengths practical.
    - a. Basis-of-Design: Product:Gradus "TT35/AFT15". Comparable products matching profile and characteristics of specified product will be considered.
      - 1) Transition Strip: Provide pre-manufactured two-piece edging.
      - 2) Material: PVC-u top and aluminum base.
      - 3) Overall Height: 10 mm.
      - 4) Width: Top - 35 mm, base - 16 mm.
      - 5) Color: As selected from manufacturers full range.
- F. Topical Concrete Vapor Sealer: Liquid penetrating type or film-forming type, designed to seal concrete and inhibit moisture transmission through slab. Concrete vapor sealers shall be as recommended by tile carpeting Contractor based upon successful previous installations and as acceptable to tile carpeting manufacturer.
  - 1. Refer to Section 012200 "Unit Prices".
  - 2. Basis of Design Product: Subject to compliance with requirements, provide "Vaporseal HM Plus" by Dependable Floor Products, or a comparable product acceptable to Architect and carpet tile manufacturer, with the following product characteristics:
    - a. Permeance: Less than 0.1 perms when applied at 11 mills (dry film thickness) per ASTM E96.
    - b. Moisture Barrier for slabs up to 100 percent relative humidity per ASTM F2170 and/or 25 pounds MVER per ASTM 1869.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

- B. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.
  - 1. Access Flooring Systems: Verify the following:
  - 2. Access floor substrate is compatible with carpet tile and adhesive if any.
  - 3. Underlayment surface is flat, smooth, evenly planed, tightly jointed, and free of irregularities, gaps greater than 1/8 inch, protrusions more than 1/32 inch, and substances that may interfere with adhesive bond or show through surface.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by carpet tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by carpet tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing of Existing Slabs:
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours, unless a higher rate is accepted by flooring manufacturer in writing.
      - 1) Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
    - b. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement, unless a higher rate is acceptable to flooring manufacturer.
- E. Concrete Vapor Sealer Application: When concrete vapor sealer is required, prepare surfaces to receive concrete vapor sealer and apply concrete vapor sealer in strict accordance with vapor sealer manufacturer's written instructions to suit slab moisture conditions encountered.
  - 1. Concrete vapor sealer shall be applied as base bid for installation of carpet over existing concrete slabs.
- F. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

### 3.3 INSTALLATION

- A. Installation: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method:
  - 1. At perimeter of each room/area: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
  - 2. In field of room/area (inside glued down perimeter): install tiles with factory-applied releasable, pressure-sensitive adhesive strips or tabs.
- C. Installation Layout: As indicated on Material Finish Legend.

- D. Maintain dye lot integrity. Do not mix dye lots in same area.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- H. Install pattern parallel to walls and borders.
- I. Metal Transition Strips: Install at locations indicated and between carpet tile and adjacent finishes. Installation shall be in strict accordance with edging manufacturer's written recommendations.

#### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

## SECTION 099123 - INTERIOR PAINTING

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Concrete.
  - 2. Concrete masonry units (CMUs).
  - 3. Steel and iron.
  - 4. Galvanized metal.
  - 5. Aluminum (not anodized or otherwise coated).
  - 6. Wood.
  - 7. Gypsum board.
  - 8. Plaster.
  - 9. Miscellaneous mechanical, electrical, plumbing, fire suppression, communication and technology work as delineated in this Section.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
  - 2. Section 012200 "Unit Prices" for unit prices affecting work of this Section.
  - 3. Section 012300 "Alternates" for those alternates related to work of this Section.
  - 4. Section 051200 "Structural Steel Framing" for shop priming structural steel.
  - 5. Section 099600 "High-Performance Coatings" for special-use coatings.

#### 1.2 DEFINITIONS

- A. Gloss Level 1 "Matte": Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2 "Flat": Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3 "Eggshell": 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4 "Satin-like": 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5 "Semi-gloss": 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6 "Gloss": 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7 "High Gloss": More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Indicate VOC content.
- B. Samples for Initial Selection: Where colors are not specifically indicated, submit for each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches square.
  - 2. Label each coat of each Sample.
- D. Product List: For each product indicated, include the following:
  - 1. Cross-reference to paint system and locations of application areas.

2. Use same designations indicated on Drawings and in schedules.
3. Include color designations.
4. VOC content.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Paint: 1 gallon of each material and color applied.

#### 1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
    - b. Other Items: Architect will designate items or areas required.
  2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
  3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

#### 1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers - Basis of Design Products: Subject to compliance with requirements, provide products by The Sherwin-Williams Company, or comparable products from other manufacturers submitted to and accepted by Architect and Owner prior to bidding.

#### 2.2 PAINT, GENERAL

- A. Material Compatibility:
  1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits for paints and paint colorants:
  1. Paints and Coatings: Less than 50 g/L.
- C. Low-Emitting Materials: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Colors: Where not indicated on Drawings, as selected by Architect from manufacturer's full range.
  1. Twenty percent of surface area will be painted with deep tones.
- E. Material Finish Schedule designations: As indicated on Material Finish Legend.
  1. Provide "flat" sheen for ceilings, unless otherwise specified.
- F. Provide "eggshell" sheen for walls, unless otherwise specified.
- G. Paint Systems: Refer to schedule at end of this Section.

## 2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  2. Testing agency will perform tests for compliance with product requirements.
  3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  1. Concrete: 12 percent.
  2. Masonry (Clay and CMUs): 12 percent.
  3. Wood: 15 percent.
  4. Gypsum Board: 12 percent.
  5. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
  1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, marker boards and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove all surface contamination such as release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
  - 1. Wash previously painted surfaces with an abrasive cleanser and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer.
  - 2. Verify that chemical removal agents (if used) have been neutralized prior to installation of paint products.
- E. Masonry Substrates: Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, mortar, efflorescence and sealers. Wash surfaces with an abrasive cleanser and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer.
  - 1. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Existing Brick Substrates: Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, efflorescence and sealers. Wash surfaces thoroughly. Where brick has been previously painted or sealed, wash surfaces with an abrasive cleanser and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas of previously painted brick with specified primer.
- G. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:
  - 1. SSPC-SP 3.
- H. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- I. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- J. Aluminum Substrates: Remove loose surface oxidation.
- K. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- L. Existing Wood Door Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Repair any major aesthetic and structural imperfections with epoxy hardening compound.
  - 3. Sand surfaces that will be exposed to view, and dust off.
  - 4. Prime edges, ends, faces, undersides, and backsides of wood.
  - 5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler.

- M. Existing Substrates: Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Prepare substrates in accordance with paint manufacturer's recommendations to ensure adhesion.

### 3.3 APPLICATION

- A. Apply paints according to paint manufacturer's written instructions and to recommendations.
1. Use applicators and techniques suited for paint and substrate indicated.
  2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
  6. Paint exposed air diffusers and grilles same color as adjacent wall or ceiling finish as directed by Architect.
  7. Mask off surfaces of doors prior to painting vision lite frames. Clean any excess paint from door surface to so that there is no evidence of excess paint remaining on door face and glass.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.
  2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
- F. Marking and Identification: Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other walls required to have protected openings and penetrations shall be permanently identified with stenciling. Such identification shall:
1. Be located in accessible concealed floor, floor/ceiling or attic spaces;
  2. Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition; and
  3. Shall include lettering not less than 3 inches in height with a minimum 3/8-inch wide stroke in a contrasting color incorporating the following wording on the first line: "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS".
- G. Green Screen Paint System:
1. Refer to paint manufacturer's installation requirements for items including but not limited to: nap size and type, roller direction during application, storage and handling during application.
  2. Apply in three coats at rate recommended by paint manufacturer.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 INTERIOR PAINTING SCHEDULE

- A. Existing Cementitious Wood-Fiber Wall Panels:
  - 1. The Sherwin-Williams Company.
    - a. 2 coats Pro-Industrial Acrylic.
- B. New Cementitious Wood-Fiber Wall Panels:
  - 1. The Sherwin-Williams Company.
    - a. 2 coats Pro-Industrial Acrylic.
- C. Existing Cementitious Wood Fiber Ceiling Panels:
  - 1. The Sherwin-Williams Company.
    - a. Seal all water stains using primer/sealer recommended by topcoat manufacturer in aerosol.
    - b. 2 coats Pro-Industrial Waterborne Acrylic Dryfall.
- D. New Cementitious Wood Fiber Ceiling Panels (099123.A07):
  - 1. The Sherwin-Williams Company.
    - a. 2 coats Pro Industrial Waterborne Acrylic Dryfall
- E. Concrete Substrates, Wall Surfaces – Latex System:
  - 1. The Sherwin-Williams Company.
    - a. 1 coat ProMar 200 Zero VOC Interior Latex Primer.
    - b. 2 coats ProMar 200 Zero VOC Latex, Eggshell
  - 2. General: Concrete floor coating system shall provide a minimum static coefficient of friction of 0.60 per ASTM C1028.
    - a. Manufacturer shall provide recommended additive to paint at a rate as acceptable to Owner and Architect, but not less than that required to achieve performance indicated above.
  - 3. Benjamin Moore & Co.
    - a. 1 coat primer as recommended by manufacturer for substrate indicated.
    - b. 2 coats of comparable product submitted to and accepted by Architect and Owner.
  - 4. PPG Paints.
    - a. 1 coat primer as recommended by manufacturer for substrate indicated.
    - b. 2 coats of comparable product submitted to and accepted by Architect and Owner.
  - 5. The Sherwin-Williams Company.
    - a. 2 coats Armorseal Tread-Plex, 100% Acrylic, semigloss.
      - 1) at 1.5 to 2 dry mills per coat.

- F. Portland Cement Plaster Substrates, Wall Surfaces - Latex System:
  - 1. The Sherwin-Williams Company.
    - 1) 1 coat Loxon Concrete and Masonry Primer, LX02 Series.
    - 2) 2 coats ProMar 200 Zero VOC Latex, Eggshell
- G. Portland Cement Plaster Substrates, Wall Surfaces - Latex System:
  - 1. The Sherwin-Williams Company.
    - 1) 1 touchup coat ProMar 200 Zero VOC Interior Latex Primer (spot prime bare areas).
    - 2) 2 coats ProMar 200 Zero VOC Latex, Eggshell
- H. Portland Cement Plaster Substrates, Ceiling Surfaces - Latex System:
  - 1. The Sherwin-Williams Company.
    - 1) 1 coat Loxon Concrete and Mason Primer, LX02 Series.
    - 2) 2 coats Pro Industrial Waterborne Acrylic Dryfall.
- I. Portland Cement Plaster Substrates, Ceiling Surfaces - Latex System:
  - 1. The Sherwin-Williams Company.
    - 1) 1 touchup coat ProMar 200 Zero VOC Interior Latex Primer (spot prime bare areas).
    - 2) 2 coats Pro Industrial Waterborne Acrylic Dryfall.
- J. CMU Substrates – Latex System:
  - 1. The Sherwin-Williams Company.
    - 1) 1 touchup coat ProMar 200 Zero VOC Interior Latex Primer (spot prime bare areas).
    - 2) 2 coats ProMar 200 Zero VOC Latex, Eggshell
- K. CMU Substrates, Wall Surfaces - Latex System.
  - 1. The Sherwin-Williams Company.
    - a. Block Filler: Pro Industrial Heavy Duty Block Filler, B42W150.
      - 1) at 16.0 mils wet, 8.0 mils dry.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, eggshell.
      - 1) at 4.0 mils wet, 1.7 mils dry, per coat.
  - 2. The Sherwin-Williams Company. (For gyms, Corridors, cafeterias, and toilets).
    - a. Block Filler: Pro Industrial Heavy Duty Block Filler, B42W150.
      - 1) at 16.0 mils wet, 8.0 mils dry.
    - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
    - c. Topcoat: Pro Industrial Pre-Catalyzed Water Based Epoxy, K45-1151 Series, eggshell.
      - 1) at 4.0 mils wet, 1.5 mils dry, per coat.
- L. CMU Substrates – Epoxy System: Refer to Section 099600.
- M. Steel Substrates – Non-primed:
  - 1. The Sherwin-Williams Company.
    - a. 1 coat of Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
    - b. 2 coats Pro Industrial WB Alkyd Urethane, semigloss.
- N. Steel Substrates – Pre-primed:
  - 1. The Sherwin-Williams Company.
    - a. 1 coat of Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
    - b. 2 coats Pro-Industrial Acrylic.
- O. Steel Hollow Metal Doors and Frames (including doors, frames, metal glass stops, vision lite frames, astragals and metal louvers):
  - 1. The Sherwin-Williams Company.
    - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
      - 1) at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
    - b. Intermediate Coat: Matching topcoat.
    - c. Topcoat: Industrial Enamel, Gloss
      - 1) at 4.0 mils wet, 1.5 mils dry, per coat.
- P. Steel Substrates (exposed metal decking, bar joists and exposed overhead structure) – Dryfall.
  - a. 2 coats Speedhide Supertech Acrylic Dryfall.

2. The Sherwin-Williams Company.
    - a. Top Coat: Pro Industrial Waterborne Acrylic Dryfall Flat, B42-181 Series, flat.
      - 1) at 6.0 mils wet, 1.5 mils dry.
    - b. Top Coat: Pro Industrial Waterborne Acrylic DryFall Eg-Shel, B42-82, eggshell.
      - 1) at 6.0 mils wet, 1.9 mils dry.
- Q. Galvanized-Metal Substrates (where not specifically indicated to be painted):
1. The Sherwin-Williams Company.
    - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
      - 1) at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
    - b. Intermediate Coat: Matching topcoat.
    - c. Topcoat: Pro Industrial Acrylic Coating, B66-650 Series, semigloss.
      - 1) at 2.5 to 4.0 mils dry, per coat.
- R. Galvanized-Metal Ductwork Substrates:
1. The Sherwin-Williams Company.
    - a. 1 coat of Pro Industrial Pro-Cryl Universal WB Acrylic Primer.
    - b. 2 coats Pro Industrial Waterborne Acrylic Dryfall.
- S. Aluminum (Not Anodized or Otherwise Coated) Substrates:
1. The Sherwin-Williams Company.
    - a. Prime Coat: Rust-inhibitive: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
      - 1) at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
    - b. Intermediate Coat: Matching topcoat.
    - c. Topcoat: Pro Industrial Acrylic Coating, B66-650 Series, semigloss.
      - 1) at 2.5 to 4.0 mils dry, per coat.
- T. Gypsum Board Wall Substrates – Latex System:
1. The Sherwin-Williams Company.
    - a. Prime Coat: ProMar 200 Zero VOC Latex Primer, B28W2600.
      - 1) at 4.0 mils wet, 1.0 mils dry.
    - b. Intermediate Coat: Matching topcoat.
    - c. Topcoat: ProMar 200 Zero VOC Latex, B20-2600 Series, eggshell.
      - 1) at 4.0 mils wet, 1.7 mils dry, per coat.
  2. The Sherwin-Williams Company. (For gyms, Corridors, cafeterias, and toilets).
    - a. Prime Coat: ProMar 200 Zero VOC Latex Primer, B28W2600.
      - 1) at 4.0 wet, 1.0 mils dry.
    - b. Intermediate Matching topcoat.
    - c. Topcoat: Pro Industrial Pre-Catalyzed Water Based Epoxy, K45-1151 Series, eggshell.
      - 1) at 4.0 mils wet, 1.5 mils dry, per coat.
- U. Gypsum Board Wall Substrates – Epoxy: Refer to Section 099600.
- V. Gypsum Board Wall and Ceiling Substrates indicated to receive Vinyl Wall Graphics – prepare per the wallcovering manufacturer's printed recommendations.
1. The Sherwin-Williams Company
    - a. 1 coat ProMar 200 Zero VOC Interior Latex Primer.
    - b. 1 coat ProMar 200 Zero VOC, eggshell.
- W. Gypsum Board Wall and Ceiling Substrates indicated to receive Wall Covering – prepare per the wallcovering manufacturer's printed recommendations.
1. The Sherwin-Williams Company.
    - a. Roman Adhesives.
      - 1) 1 coat Pro-977 Ultra Prime.
- X. Wood Doors (Existing):
1. The Sherwin-Williams Company.
    - a. Fill damaged areas and sand smooth.
    - b. Prime Coat: PrepRite ProBlock Int./Ext. Latex Primer-Sealer, B51-600 Seireat 4.0 mils wet, 1.4 mils dry.
      - 1) at 4.0 mils wet, 1.4 mils dry.
    - c. Intermediate Coat: Matching topcoat.
    - d. Topcoat: Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series.

1) at 2.5 to 4.0 mils dry, per coat.

Y. Wood Trim and Decorative Paneling (Opaque Finish):

END OF SECTION

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## SECTION 099600 - HIGH PERFORMANCE COATINGS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:
  - 1. Exterior Substrates:
    - a. Steel.
    - b. Galvanized metal.
  - 2. Interior Substrates:
    - a. Concrete masonry units (CMUs).
    - b. Gypsum board.
- B. Related Requirements:
  - 1. Section 012100 "Allowances" for those allowances affecting work of this Section.
  - 2. Section 012200 "Unit Prices" for unit prices affecting work of this Section.
  - 3. Section 099123 "Interior Painting" for general field painting.

#### 1.2 DEFINITIONS

- A. Gloss Level 3 "Eggshell": 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 5 "Semi-gloss": 35 to 70 units at 60 degrees, according to ASTM D 523.
- C. Gloss Level 6 "Gloss": 70 to 85 units at 60 degrees, according to ASTM D 523.
- D. Gloss Level 7 "High Gloss": More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
  - 1. Submit Samples on rigid backing, 8 inches square.
  - 2. Apply coats on Samples in steps to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
  - 1. Cross-reference to coating system and locations of application areas.
  - 2. Use same designations indicated on Drawings and in schedules.
  - 3. Color designations.

#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Coatings: One (1) gallon of each material and color applied.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

## 1.6 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers - Basis of Design Products: Subject to compliance with requirements, provide products by The Sherwin-Williams Company, or comparable products from other manufacturers submitted to and accepted by Architect and Owner prior to bidding.

### 2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
  - 3. Products shall be of same manufacturer for each coat in a coating system.
- B. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits for paints and paint colorants:
  - 1. Paints and Coatings: Less than 50 g/L.
- C. Low-Emitting Materials: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Colors: Where not indicated on Drawings, as selected by Architect from manufacturer's full range.
- E. Paint Systems: Refer to schedule at end of this Section.
- F. Material Finish Legend designations:
  - 1. Wall & Ceiling Finishes: 099600.A01, finishes **"HP1."**

### 2.3 SOURCE QUALITY CONTROL

- A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner may engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been

- delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
  3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  1. Concrete: 12 percent.
  2. Fiber-Cement Board: 12 percent.
  3. Masonry (Clay and CMUs): 12 percent.
  4. Wood: 15 percent.
  5. Gypsum Board: 12 percent.
  6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
  1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.
  1. Prepare previously painted surfaces indicated to receive new paint finish in strict accordance with paint manufacturer's written recommendations.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.
- D. Concrete Substrates: Remove all surface contamination such as release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  1. Clean concrete by one of the following methods as recommended by paint manufacturer:
    - a. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.
    - b. Abrasive blast clean surfaces to comply with SSPC-SP 7/NACE No. 4.
  2. Verify that chemical removal agents (if used) have been neutralized prior to installation of paint products.
- E. Masonry Substrates: Remove all surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, mortar, efflorescence and sealers. Wash surfaces with an abrasive cleanser and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer.

1. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.
  2. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.
- F. Existing Pre-Painted CMU Substrates: Clean and prepare as recommended by coating manufacturer.
- G. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- H. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- I. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.
- J. Aluminum Substrates: Remove loose surface oxidation.

### 3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions.
1. Use applicators and techniques suited for coating and substrate indicated.
  2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
  3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
1. Contractor shall touch up and restore coated surfaces damaged by testing.
  2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

### 3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Galvanized Metals, Bollards and Trash Enclosure Framing:
  - 1. The Sherwin-Williams Company.
    - a. 1 coat Macropoxy 646.
    - b. 1 coat Pro Industrial WB Alkyd Urethane.
- B. Steel Substrates:
  - 1. The Sherwin-Williams Company.
    - a. 1 coat Macropoxy 646-100.
    - b. 1 coat FluoroKem HS.

### 3.7 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Concrete and CMU Substrates - Epoxy System (non-wet walls):
  - 1. The Sherwin-Williams Company.
    - a. 1 coat Loxon Block Surfacers, 18 mils wet, 8 mils dry.
    - b. 2 coats Pro Industrial Pre-Catalyzed Waterbased Epoxy, 1150 Series, single-component,
      - 1) Eggshell
- B. Concrete and CMU Substrates - Epoxy System (wet areas):
  - 1. The Sherwin-Williams Company.
    - a. 1 coat Pro Industrial Heavy-Duty Block Filler.
    - b. 2 coats Pro Industrial Zero VOC Waterborne Catalyzed Epoxy, two-component,
      - 1) Eggshell
- C. Gypsum Board Wall Substrates – Epoxy:
  - 1. The Sherwin-Williams Company.
    - a. 1 coat ProMar 200 Zero VOC Interior Primer.
    - b. 2 coats Pro Industrial Pre-Catalyzed Waterbased Epoxy, 1150 Series, single-component,
      - 1) Eggshell
- D. Gypsum Board Wall Substrates – Epoxy (wet areas):
  - 1. The Sherwin-Williams Company.
    - a. 1 coat ProMar 200 Zero VOC Interior Primer.
    - b. 2 coats Pro Industrial Zero VOC Waterborne Catalyzed Epoxy, two-component,
      - 1) Eggshell
- E. Gypsum Board Ceiling Substrates – Epoxy (wet areas):
  - 1. The Sherwin-Williams Company.
    - a. 1 coat Sherwin Williams Macropoxy 646-100.
    - b. 2 coats Pro Industrial Zero VOC Waterborne Catalyzed Epoxy, two-component,
      - 1) Eggshell
- F. Existing Tile Substrates and Existing Pre-Painted CMU Substrates:
  - 1. The Sherwin-Williams Company.
    - a. 1 coat Extreme Bond Primer.
    - b. 1 base coat Pro Industrial Pre-Catalyzed Waterbased Epoxy, 1150 Series, single-component, Eggshell
    - c. 2 coats Pro Industrial Zero VOC Waterborne Catalyzed Epoxy, two-component, [eggshell][gloss].

END OF SECTION

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## **SECTION 101423 - ADA AND CODE SIGNAGE**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Wayfinding Panel Signage (101423.A01):
    - a. Interior Room signage.
    - b. Custom fabricated polymer plastic signage.
- B. Related Sections include the following:
  - 1. Section 012100 "Allowances" for interior room signage.

#### **1.2 DEFINITIONS**

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."
- B. Signage Contractor: Contractor responsible for the fabrication and installation of signage unless responsibility for fabrication or installation is called out by others in the drawings.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Including but not limited to, the following:
  - 1. Manufacturer's technical product data for each type of product specified. Include data on physical characteristics, durability, fade resistance, flame resistance and manufacturing process.
  - 2. Product data shall show compliance with requirements for fire performance characteristics and physical properties.
- B. Shop Drawings: Show fabrication and installation details for signs.
  - 1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
  - 2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
  - 3. Include fabrication and installation details, and attachments to other work.
  - 4. Include elevations, component details, and attachments to other work for wayfinding signage.
  - 5. Indicate materials and profiles of signage fittings, joinery, finishes, fasteners, anchorages, and accessory items.
  - 6. Field Dimensions shall be obtained, reviewed, and accepted by signage manufacturer prior to submittal of shop drawings.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:
  - 1. Aluminum.
- D. Samples for Verification:
  - 1. Sample from same flitch to be used for the Work, with specified finish applied.
  - 2. Submit full-size samples of wayfinding signage. Quantity and type shall be determined by Architect with intent of one sample per each signage type representative of all types of products indicated.
- E. Sign Schedule: Use same designations indicated on Drawings.
- F. Mockups/Field Samples: Build mockups/field samples to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Warranty: Special warranty specified in this Section.
- C. Provide written documentation that the braille translation included on the manufacturer's signage provided in this section has been evaluated by the American Foundation for the Blind, and is, in their opinion, correct and compliant with ADAAG.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Fabricator Qualifications: A firm that employs skilled workers experienced in producing custom-fabricated products similar to those required for this Project and with at least seven years continuous experience under the current company name. Fabricator shall have a record of successful in-service performance, as well as sufficient production capacity to produce required units.
  - 1. Fabricator shall have completed at least seven (7) similar signage projects having similar requirements within the last four (4) years for each signage type.
- C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- D. Regulatory Requirements: Comply with applicable provisions in ICC A117.1.
- E. Fire Performance Characteristics: Provide wall coverings with the following surface burning characteristics as determined by testing identical products per ASTM E 84 by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify wall coverings with appropriate markings of applicable testing and inspecting organization.
  - 1. Flame Spread: 5 or less.
  - 2. Smoke Developed: 25 or less.
- F. Accessibility Guidelines: Signage shall comply with ICC A117.1 where applicable. Characters and graphics, including but-not limited to, copy height, letter stroke symbols, materials, and finishes indicated on the Drawings are intended as guidelines for compliance. Implement each applicable ADA guideline. Should conflicts arise, notify the Designer before proceeding.

#### 1.7 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.
  - 1. Required parties include the contractor, sub-contractor and architect/designer.
  - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 3. Review temporary protection requirements for during and after installation.

#### 1.8 PROJECT CONDITIONS

- A. Interior Environmental Limitations: Do not deliver and install vinyl wall graphics until spaces are enclosed and weathertight, wet work in spaces to receive murals is complete and dry, work above ceilings is complete, and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1. Maintain a constant temperature not less than 60 deg F in installation areas for at least 10 days before and 10 days after installation.
- B. Lighting: Do not install vinyl wall graphics until permanent level of lighting is provided on the surfaces to receive murals.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by the vinyl wall graphics manufacturer for full drying and curing.
- D. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

## 1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install ADA and Code Signage units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

## 1.10 DELIVERY, STORAGE AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage to signage. Store materials to permit easy access for inspection and identification.
- B. Store signage in a well-ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

## 1.11 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.
- B. For signage furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

## 1.12 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Deterioration of metal and polymer finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image colors.
  2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

### 2.2 MATERIALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. Provide materials without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

- B. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
  - 1. Plate and Sheet: ASTM B 209, Alloy 3003-H14, Alloy 5005-H32 or Alloy 6061-T6.
  - 2. Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
  - 3. Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- D. PETG (Polyethylene Terephthalate Glycol) Sheet: ASTM D 5047-17 category as standard with manufacturer for each sign.
  - 1. Tensile Strength: 7,700 lbf/sq. in. per ASTM D 638.
  - 2. Flexural Modulus of Elasticity: 310,000 lbf/sq. in. per ASTM D 790.
- E. Photopolymer Sheet: Manufacturer's recommended photopolymer for producing integral non-laminated raised copy.
- F. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, ASTM C 1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), coated on both surfaces with abrasion-resistant coating:
  - 1. Impact Resistance: 16 ft-lbf/in. per ASTM D 256, Method A.
  - 2. Tensile Strength: 9000 lbf/sq. in. per ASTM D 638.
  - 3. Flexural Modulus of Elasticity: 340,000 lbf/sq. in. per ASTM D 790.
  - 4. Heat Deflection: 265 deg F at 264 lbf/sq. in. per ASTM D 648.
  - 5. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044.
- G. Expanded PVC Sheet: Subject to compliance with requirements, provide "Sintra" by 3A Composites.
  - 1. Material: Moderately expanded closed-cell polyvinyl chloride.
  - 2. Color: As selected by Architect from manufacturer's full range.
- H. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

## 2.3 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Aluminum Finishes
  - 1. Clear Anodic Finish: Manufacturer's standard Class 1 clear anodic coating, 0.018 mm or thicker, over a satin (directionally textured) mechanical finish, complying with AAMA 611.
- E. Acrylic Sheet Finishes
  - 1. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

## 2.4 ACCESSORIES

- A. Mounting Methods: Use double sided vinyl tape and silicone adhesive fabricated from materials that are not corrosive to sign materials and mounting surface.
- B. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
  - 1. Use concealed fasteners and anchors unless indicated to be exposed.
  - 2. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
    - b. Fastener Heads: For nonstructural connections, use oval countersunk screws and bolts with tamper-resistant, Allen-head slots unless otherwise indicated.

## 2.5 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.
  - 1. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
  - 2. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
  - 3. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.
  - 4. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Sign Message Panels: Construct sign-panel surfaces to be smooth and to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner.
  - 1. Increase panel thickness or reinforce with concealed stiffeners or backing materials as needed to product surfaces without distortion, buckles, warp, or other surface deformations.

## 2.6 WAYFINDING PANEL SIGNAGE – ROOM SIGNAGE (101423.A01)

- A. General: Panel signs shall be acrylic or photopolymer signs with aluminum holder for name insert to match existing. Refer to Drawings for existing sign construction.
  - 1. Provide painted edges for solid appearance.
  - 2. Provide white raised numbers and braille, unless otherwise indicated or required by code.
- B. 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. Ad Trends.
  - 2. APCO Signs.
  - 3. ASI Sign Systems, Inc.
  - 4. Fast Signs.
  - 5. Gemini.
  - 6. Howard Industries.
  - 7. Innerface Architectural Signage, Inc.
  - 8. Modulex.
  - 9. Nova Polymers.
  - 10. Star Signs.
  - 11. Take Form.
  - 12. 2/90 Sign Systems.
- C. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of slide-in inserts.
- D. Tactile and Braille Sign: Manufacturer's standard process for producing text and symbols complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with

domed or rounded shape.

1. Raised-Copy Thickness: Not less than 1/32 inch.
- E. Subsurface Copy: Apply minimum 4-mil- thick vinyl copy to back face of clear acrylic sheet forming panel face to produce precisely formed opaque image. Image shall be free of rough edges.
- F. Colored Coatings for Acrylic Sheet: For copy background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are UV and water resistant for five years for application intended.
1. Color: As selected by Architect from manufacturer's full range.
- G. Sign Types – General: Signs shall match existing interior signage to best extent possible in accordance with applicable codes and as acceptable to Architect.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs.
- C. Verify that anchor inserts are correctly sized and located to accommodate signs.
- D. Verify that items provided under other sections of Work are sized and located to accommodate signs.
- E. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.
- G. Field verify dimensions of all conditions.

### 3.2 INSTALLATION, GENERAL

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
  1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
  2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.
- C. Wall-Mounted Signs on Smooth Surfaces: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
  1. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces. Where signage is located on exterior surfaces, provide exterior rated adhesive as recommended by signage manufacturer for substrate indicated.
- D. Wall-Mounted Signs on Textured Surfaces: Comply with sign manufacturer's written instructions except where more stringent requirements apply. Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
  1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support

sign in position until adhesive fully sets.

- b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

- E. Vertical Tolerance: Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1m)

### 3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.
- B. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes to components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- C. Remove temporary protective coverings and strippable films as signs are installed.
- D. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean conditions during construction and protect from damage until acceptance by Owner.

END OF SECTION

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## **SECTION 102113 - TOILET COMPARTMENTS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Solid-polymer (HDPE) toilet compartments configured as toilet enclosures (102113.A01).
  - 2. Solid-polymer (HDPE) urinal screens (102113.A02).
- B. Related Sections:
  - 1. Section 061000 "Rough Carpentry" for blocking.
  - 2. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, and similar accessories.

#### **1.2 COORDINATION**

- A. Coordinate requirements for blocking, reinforcing, and other supports concealed within walls.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For toilet compartments and urinal screens. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show layout and size of each toilet compartment.
  - 2. Show layout and size for each urinal screen.
  - 3. Show locations of cutouts for compartment-mounted toilet accessories.
  - 4. Show locations of centerlines of toilet fixtures.
  - 5. Show locations of floor drains.
- C. Samples for Initial Selection: For each type of unit indicated. Include Samples of compartment material involving texture and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
  - 1. Each type of material, color, texture, and finish required for units, prepared on 6-inch- square Samples of same thickness and material indicated for Work.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

#### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who has five years of similar installations.
- B. Source Limitations: For products listed in the Part 2 articles, obtain products from single source from single manufacturer.

#### **1.6 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

## 1.7 WARRANTY

- A. Guarantee entire installation for a period of two years from date of project Substantial Completion against defects in material and workmanship. Guarantee covers repair or replacement, with no costs to the Owner, of any and all items which become defective within the 25-year period.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.
- B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

### 2.2 SOLID-POLYMER TOILET COMPARTMENTS (102113.A01)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Scranton Products, Hiney Hiders "Eclipse" toilet enclosure units or comparable product by one of the following:
  - 1. Accurate Partitions Corporation.
  - 2. Bradley Corporation; Mills Partitions.
  - 3. General Partitions Mfg. Corp.
  - 4. Hadrian
  - 5. Partition Systems Incorporated of South Carolina (PSISC).
- B. Toilet-Enclosure Style: Floor-mounted overhead braced.
  - 1. Compartment Depth and Width: As scheduled and indicated on Drawings.
  - 2. Door Width: As scheduled and indicated on the Drawings.
  - 3. Height Above Floor: 9 inches (305 mm).
  - 4. Door/Panel Height: As scheduled and indicated on the Drawings.
  - 5. Pilaster Height: As scheduled and indicated on Drawings.
- C. Urinal-Screen Style: Floor-mounted, overhead braced with continuous wall brackets.
- D. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, seamless, with eased edges, "no-sightline system" and with homogenous color and pattern throughout thickness of material.
  - 1. Material Thicknesses:
    - a. Doors, Pilasters, Panels and Screens: 1 inch.
      - 1) Edge condition: Eased edges, except shiplap at latch stile of door to pilaster to eliminate sightline into toilet compartment.
    - b. Panels: Not less than 1 inch.
    - c. Compartments shall incorporate a lap joint at latch stile of doors and adjacent pilaster, and continuous hinges at hinge stile of door and adjacent pilaster to eliminate sightlines into stalls.
  - 2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
  - 3. Pilaster shoes shall be 3 inches (76 mm) high, one-piece molded HDPE secured to the pilaster with a stainless-steel tamper resistant Torx head sex bolt.
  - 4. Color and Pattern: One color, pattern and texture in each room.
    - a. Color and Pattern: As selected by Architect from manufacturer's full range.
- E. Brackets (Fittings):
  - 1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum or stainless steel.

## 2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
  - 1. Material: Clear-anodized aluminum or stainless steel.
  - 2. Hinges: Provide 8-inch, "wrap-around" hinges fabricated from aluminum in a bright anodized finish. Hinges shall have field adjustment capability. Hinge shall be self-closing to within 15 degrees of opening. Mount with through-bolts.
  - 3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
    - a. Coordinate design of door and latch to provide "no-sight line" configuration.
    - b. Type 1 Latch and Keeper: Manufacturer's standard stainless-steel surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Intent is to match existing.
    - c. Type 2 Latch: Manufacturer's standard stainless-steel occupancy indicator latch. Latch to be mounted to the pilaster with integrated function as keeper for in-swinging doors. Latch will provide emergency access through an accessible slotted center pin in the external indicator.
  - 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
  - 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
  - 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with vandal-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

## 2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless-Steel Castings: ASTM A 743/A 743M.
- E. High density polyethylene (HPDE), fabricated from polymer resins compounded under high pressure, forming single thickness panel.

## 2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Floor-Mounted Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
  - 1. Each pilaster over 3 inches wide shall be anchored to floor with a minimum of two (2) anchors to prevent twisting.
  - 2. Overhead Bracing shall not be installed over open stall areas. At areas where additional overhead support is necessary, consult with architect to provide alternate means of support.

- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- wide, in-swinging doors for standard toilet compartments and 36-inch- wide, out-swinging doors with a minimum 32-inch- wide, clear opening for compartments designated as accessible.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
  - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:
    - a. Pilasters and Panels: 1 inch.
    - b. Panels and Walls: 1 inch.
  - 2. Brackets: Secure panels to walls and to pilasters with continuous brackets.
    - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Urinal Screens: Attach screens to pilasters and walls with continuous brackets and anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

### 3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.
- B. Clean exposed surfaces of compartment systems using materials and methods recommended by manufacturer and provide protection as necessary to prevent damage during remainder of construction period.

### 3.4 FINAL PROTECTION

- A. Provide final protection and maintain conditions the ensure toilet compartments and screens are without damage and deterioration at time of Substantial Completion.
- B. If any damage occurs, replace unit(s), unless repairs acceptable to Architect can be made.
- C. Should damage occur to partition, door or pilaster in shipping, those damaged items shall be replaced within 30 days.

## END OF SECTION

## **SECTION 102123 - CUBICLE CURTAINS AND TRACK**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Curtain tracks, carriers and cubicle curtains (102123.A01)
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for supplementary wood framing and blocking for mounting items requiring anchorage.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include durability, laundry temperature limits, fade resistance, applied curtain treatment and fire-test response characteristics for curtain fabric.
- B. Shop Drawings:
  - 1. Show layout of cubicles, sizes of curtains, number of carriers, anchorage details, and accessories.
  - 2. Include details on blocking above ceiling
- C. Samples for Verification: For curtain fabric, mesh top and curtain carrier.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data.

#### **1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials described below.
  - 1. Curtain Carriers and Track End Caps: Provide one set of end caps and one full set of curtain carriers.
  - 2. Curtains: Provide one additional curtain.

### **PART 2 PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Curtains: Provide curtain fabrics with the following characteristics:
  - 1. Launderable to a temperature of not less than 160 deg F.
  - 2. Flame resistant and identical to those that have passed NFPA 701 when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.
    - a. Identify fabrics with appropriate markings of a qualified testing agency.

#### **2.2 CURTAIN SUPPORT-SYSTEM MANUFACTURERS**

- A. Product: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include:
  - 1. ADC Hospital Equipment; Division of Automatic Devices Company.
  - 2. C/S General Cubicle.
  - 3. Imperial Fastener Company, Inc.
  - 4. InPro Corporation.
  - 5. Spect-Tex, Inc.

## 2.3 CURTAIN SUPPORT SYSTEMS

- A. Extruded-Aluminum Curtain Track: Not less than 1-1/4 inches wide by 3/4 inch high; with manufacturer's standard wall thickness.
  - 1. Curved Track: Factory-fabricated, 12 inch radius bends.
  - 2. Finish: Clear anodized.
- B. Curtain Track Accessories: Fabricate from same material and with same finish as track with non-removable end stops.
- C. Curtain Carriers: Two nylon rollers and nylon axle with chrome-plated steel hook.
- D. Exposed Fasteners: Stainless steel.

## 2.4 CURTAINS

- A. Cubicle Curtain Fabric (102123.A01 – **F1**): Curtain manufacturer's standard, inherently and permanently flame resistant, stain resistant, and antimicrobial.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide products by Maharam "Carry 2 No. 511518" or comparable product from other manufacturers submitted to and accepted by architect prior to bidding.
  - 2. Pattern and Color: 006 Inhale
  - 3. Repeat: 50 inch vertical, 72 inch horizontal, railroaded.
  - 4. Content: 72% Polyester (flame retardant), 28% Post-consumer Recycled Polyester (flame retardant).
  - 5. Backing: None.
  - 6. Weight: Not less than 12.1 oz/ly.
- B. Curtain Grommets: Nickel-plated brass; spaced not more than 6 inches o.c; machined into top hem.
- C. Mesh Top: Not less than 20 inch high mesh top of No. 50 nylon mesh
- D. Fabricate curtains as follows:
  - 1. Width: Equal to track length from which curtain is hung plus 10 percent added fullness, but not less than 12 inches added fullness.
  - 2. Length: Equal to floor-to-ceiling height, minus depth of track and carrier at top, and minus clearance above the finished floor as follows:
    - a. Cubicle Curtains: 12 inches.
- E. Seams: Vertical Seams: Not less than 1/2 inch wide, double turned and double stitched.
- F. Bottom Hem: Not less than 1 inch and not more than 1-1/2 inches wide, double thickness and double lock-stitched.
- G. Mesh Top: Top hem of mesh not less than 1 inch and not more than 1-1/2 inches wide, triple thickness, reinforced with integral web, and double lock-stitched. Double lockstitch bottom of mesh directly to 1/2 inch triple thickness, top hem of curtain fabric.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. General: Install tracks level and plumb, according to manufacturer's written instructions.
  - 1. Up to 20 feet in length, provide track fabricated from single continuous length.
    - a. Curtain Track Mounting: Surface.
- B. Surface-Track Mounting: Fasten tracks to ceilings at intervals recommended by manufacturer. Fasten tracks to structure at each splice and tangent point of each corner. Center fasteners in track to ensure unencumbered carrier operation.

1. Track Accessories: Install splices, end caps, connectors, end stops, coupling and joining sleeves, and other accessories as required for a secure and operational installation.
- C. Curtains and Curtain Carriers: Provide curtain carriers adequate for 6 inch spacing along full length of curtain plus an additional carrier.
  1. Curtains: Hang curtains on each curtain track.

END OF SECTION

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## **SECTION 102600 - WALL AND DOOR PROTECTION**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Corner Guards (102600.A03).
- B. Related Requirements:
  - 1. Section 092900 "Gypsum Board" for corner trim included in gypsum board installation.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
  - 2. Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for each type of impact-resistant wall-protection unit indicated.
  - 1. Include Samples of accent strips and accessories to verify color selection.
  - 2. Digital Protective Wallcovering – submit a sample of each wall graphic type in the form of small-scale color proofs for each graphic or mural.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Corner Guards: 12 inches long.
  - 2. Custom Printed Wall Graphic on Abuse Resistant Wall coverings: Provide sample of wallcovering containing printed graphic using artwork provided by Architect. Before printing, prepare full-color proofs which include a full-scale sample, as well as a reduced sample of the entire graphic for each wall graphic for the Architect's approval. Approved proof will set quality standards for graphic and aesthetic effect.
    - a. Sample size to be no less than 2'-0" to 4'-0" square or as otherwise indicated.
    - b. Sample area as indicated by Architect during proofs.
    - c. When wall graphic is divided into separate sections, provide separate proof of each section.
    - d. Samples to show color, texture, pattern, and thickness.
    - e. Sample of each product specified.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.
  - 1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

#### **1.4 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Section 01 40 00 "Quality Requirements."
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Preinstallation Conference: Conduct conference at Project site.

## 1.6 MOCKUPS

- A. Mockups/Field Samples: Build mockups/field samples, to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Field Samples: Build field sample/mockup of typical wall areas as shown on Drawings.
    - a. Note: Mockup shall be a field sample of corner guard, baseboard, and adjacent areas in Project. Architect and manufacturer's representative will observe installation of first corner guard installation at Architect's selected location.
- B. Field testing shall be performed on field sample areas according to requirements in "Field Quality Control" Article.
- C. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
  - 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.

## 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

## PART 2 PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.

### 2.2 CORNER GUARDS

- A. Surface-Mounted, Opaque Plastic Corner Guards (102600.A03 – **CG1**): Fabricated from colored polycarbonate plastic sheet; with formed edges, installed with mechanical fasteners to wall construction; including mounting hardware; fabricated with 90- or 135-degree turn as necessary to match wall condition. Fabricate in continuous lengths.

- B. Basis-of-Design Product: Subject to compliance with requirements, provide Construction Specialties; "Acrovyn LG-200", or comparable product from one of the following:
  - 1. Arden Architectural Specialties, Inc.
  - 2. Balco, Inc.
  - 3. Construction Specialties, Inc.
  - 4. Korogard Wall Protection Systems; a division of RJF International Corporation.
  - 5. Pawling Corporation.
  - 6. Inpro Corporation.
- C. Product Characteristics:
  - 1. Material: Impact resistant Clear Polycarbonate of 16 ft. lbs/inch tested per ASTM D-256.
  - 2. Length of legs: 2 1/2 inch.
  - 3. 1/32 inch (1.0 mm) radius cover.
  - 4. Height: From top of base to ceiling unless otherwise indicated on the drawings.

## 2.3 MATERIALS

- A. Fasteners: Nonmagnetic stainless-steel metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- B. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
- C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- D. Adhesive: As recommended by protection product manufacturer.
- E. PVC Plastic: ASTM D 1784, Class 1, textured, chemical and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout.
  - 1. Impact Resistance: Minimum 25.4 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
  - 2. Chemical and Stain Resistance: Tested according to ASTM D 543 and ASTM D 1308.
  - 3. Self-extinguishing when tested according to ASTM D 635.
  - 4. Flame-Spread Index: 25 or less.
  - 5. Smoke-Developed Index: 450 or less.
- F. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated, but with not less than strength and durability properties specified in ASTM B 221 for Alloy 6063-T5.
- G. PETG (Polyethylene Terephthalate Glycol):
  - 1. Impact Resistance: Minimum 10 kj.m2 when tested according to ISO 180.
  - 2. Chemical and Stain Resistance: Tested in accordance with ASTM D543.
  - 3. Flame-Spread Index: 25 or less.
  - 4. Smoke-Developed Index: 450 or less.
- H. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 coating, either commercial steel, Type B, or structural steel, Grade 33, unless another grade is required by design loads.

## 2.4 FABRICATION

- A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.
  - 1. Provide surfaces free of chips, dents, and other imperfections.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components. Before installation, clean substrate to remove dust, debris, and loose particles.

### 3.3 INSTALLATION AND CLEANING

- A. General: Install impact-resistant wall protection units plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
  - 1. Install wall protection units in locations and at mounting heights indicated on Drawings.
  - 2. Provide mounting hardware, anchors, and other accessories required for a complete installation.
    - a. Provide anchoring devices to withstand imposed loads.
- B. Immediately after completion of installation, clean plastic covers and accessories as recommended by corner guard manufacturer.
- C. Stainless Steel Corner Guards: Install corner guards using countersunk oval head mechanical fasteners and supplement with manufactures recommended adhesive. Corner guard edges to be flush with adjacent wall to allow for no gapping.

END OF SECTION

## **SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES**

### **TOILET, BATH, AND LAUNDRY ACCESSORIES**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Public-use washroom accessories.
    - a. Toilet Tissue Dispenser (102800.A01).
    - b. Paper Towel Dispenser (102800.A02).
    - c. Waste Receptacle 102800.A03).
    - d. Soap Dispenser (102800.A05).
    - e. Grab Bar (102800.A06).
    - f. Sanitary Napkin Receptor Unit (SNR) (102800.A08).
    - g. Mirror Unit (102800.A10).
    - h. Coat Hook (102800.A15).
  - 2. Accessories:
    - a. Under Lavatory guards (102800.A21).
- B. Related Sections:
  - 1. Section 061000 "Rough Carpentry" for blocking required behind fixtures and accessories.
  - 2. Section 102113 "Toilet Compartments".
  - 3. Section 102116 "Shower & Dressing Compartments".
  - 4. Division 26 for electrical requirements for illuminated mirror units and warm air dryers.
- C. Owner will furnish, and contractor install the following accessories:
  - 1. Toilet tissue dispensers.
  - 2. Paper towel dispensers.
  - 3. Soap dispensers.
- D. Owner will furnish and install the following accessories:
  - 1. Waste receptacles.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include the following:
  - 1. Construction details and dimensions.
  - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
  - 3. Material and finish descriptions.
  - 4. Features that will be included for Project.
  - 5. Manufacturer's warranty.
  - 6. Include electrical characteristics.
- B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.
  - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify products using designations indicated.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.
- B. Warranty: Sample of special warranty.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

#### 1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
  - 1. Where cutouts are required in other work, provide templates, substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

#### 1.6 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, visible silver spoilage defects.
  - 2. Warranty Period: 15 years from date of Substantial Completion.

### PART 2 PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

#### 2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

#### 2.3 PUBLIC-USE WASHROOM ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products specified from Bobrick Washroom Equipment, Inc. or comparable products by one of the following:

1. American Specialties, Inc.
  2. Bradley Corporation.
- B. Toilet Tissue Dispenser (102800.A01 - TTD) – Provided by Owner, Installed by Contractor.
- C. Paper Towel Dispenser (102800.A02 - PTD) – Provided by Owner, Installed by Contractor.
- D. Soap Dispenser (102800.A05 - SD) – Provided by Owner, Installed by Contractor.
- E. Grab Bars – GB, VGB, FGB (102800.A06):
1. Bobrick:
    - a. B-6806.99; 36" 42" & 18" at Accessible Toilet Stalls.
    - b. B-6806.99; 18" & B-5861.99 at Shower.
    - c. B-6806.99; Series Wall-to-Floor Bar w/ bottom rail at DFs w/out Alcove.
    - d. FGB: B-4998.99 at Accessible Toilet and Shower Stall.
    - e. B-819298 Drinking Fountain Grab Bar; 33" height, projects 18" from the wall.
  2. Bradley:
    - a. 832-2 Series; 36" 42" & 18" at Accessible Toilet Stalls.
    - b. 832-2 Series; 18" & 16"x30" Horizontal Two-Wall Bar at Shower Stall.
    - c. 832-2 Series; Wall-to-Floor Bar w/ bottom rail at DFs w/out Alcove.
    - d. FGB: 8370-107-2 at Accessible Toilet and Shower Stall.
  3. ASI:
    - a. 3800-P Series; Type 01 36" 42" & 18" at Accessible Toilet Stalls.
    - b. 3800-P Series; Type 01 18" & Type 60 at Shower Stall.
    - c. 3800-P Series; Type 75 at Drinking Fountains without Alcove.
    - d. FGB: 3413-P at Accessible Toilet and Shower Stall.
- F. Sanitary-Napkin Receptor Unit (102800.A08 - SNR):
1. Basis of Design Products:
    - a. Bradley: Model 4721-15 & 4722-15.
    - b. ASI: Model 0473-1A & 0472-1.
  2. Mounting: Surface.
  3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
  4. Receptacle: Removable.
  5. Material and Finish: Stainless steel, No. 4 finish (satin).
- G. Mirror Unit (102800.A10 – M1, M2, M3):
1. Basis-of-Design Products:
    - a. Bobrick Washroom Equipment, Inc.; B-290 Series.
    - b. ASI: Model 0600.
  2. Types:
    - a. M1 – Shall be 24-inches wide x 36-inches height.
    - b. M2 – Shall be 60-inches wide x 36-inches height.
    - c. M3 - Shall be 72-inches wide x 36-inches height.
  3. Frame Stainless-steel channel, in No.4 satin finish.
  4. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
    - a. Concealed wall hanger bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
    - b. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
  5. Glazing: Provide polished tempered glass mirror in locker rooms and gym facilities. Provide polished non-tempered glass mirror in other locations unless noted otherwise.
  6. Sizes: As indicated on Drawings.
- H. Coat Hook (102800.A15 - CH):
1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-542 Series.
  2. Description: Single hook pin model with concealed mounting. Unit shall be 1-15/16 inch in diameter.
  3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

## 2.4 UNDER-LAVATORY GUARDS

- A. Under-lavatory Guard (102800.A21):
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Plumberex Specialty Products, Inc.
    - b. Truebro by IPS Corporation.
  - 2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
  - 3. Material and Finish: Antimicrobial, molded plastic, white.

## 2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf when tested according to ASTM F 446.

### 3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

## END OF SECTION

## SECTION 123200 - MANUFACTURED WOOD CASEWORK

### PART 1 GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced wood cabinets of stock design.
2. Base Cabinet (123200.A01).
3. File Drawer (123200.A05).
4. Sink Base (123200.A10).
5. ADA Sink Base (123200.A11).
6. Tall Cabinet (123200.A21).
7. Cubicle Tall Cabinet with Trays (123200.A23).
8. Wardrobe (123200.A25).
9. Wall Cabinet (123200.A31).
10. Mail Cubicle Wall Cabinet (123200.A33).
11. Filler (123200.A81).
12. Finished End (123200.A82).
13. End Panel (123200.A83).
14. Apron (123200.A84).
15. Cabinet Locks (123200.A91).

B. Related Sections:

1. Section 012300 "Alternates" for those alternates effecting work of this Section.
2. Section 061000 "Rough Carpentry" for wood blocking for anchoring manufactured wood casework.
3. Section 064023 "Interior Architectural Woodwork" for custom plastic-laminate-clad casework, countertop brackets.
4. Section 092116 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring casework.
5. Section 096513 "Resilient Base and Accessories" for resilient base applied to manufactured wood casework.
6. Section 123666 "Solid Surfacing Countertops".

#### 1.2 DEFINITIONS

- A. Definitions in the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" apply to the work of this Section.
- B. Balanced Construction: Where exposed face of a panel is surfaced with high pressure plastic laminate and the opposite (back) surface shall receive a balanced product equal in thickness to the face of the panel.
1. Note: Color for interior is not required to match color and pattern of exterior face laminate.
- C. Casework: Modular casework of this Section is that which is pre-manufactured to standard dimensions or sizes. Casework fabricated as part of Section 064023 "Interior Architectural Woodwork" is that which is custom fabricated to suit a particular project.
- D. Concealed Portions of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets.
- E. MDF: Medium-density fiberboard.
- F. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive, and faced both front and back with hardwood veneers.
- G. Exposed Portions of Cabinets: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and surfaces visible in open cabinets and behind glass doors.
1. Ends of cabinets installed directly against walls or other cabinets shall not be considered as exposed.

- H. Semi-exposed Portions of Cabinets: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches or more above floor are defined as semi-exposed.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, submit data describing materials, fabrication, hardware accessories, and installation instructions.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Indicate types, sizes and finishes of cabinets and countertops.
  - 2. Indicate types and locations of hardware.
  - 3. Indicate locations and types of service fittings.
  - 4. Show fabrication details; including locations and sizes for cutouts and holes for plumbing fixtures, science equipment and other items installed in casework.
  - 5. Indicate locations of blocking and reinforcements required for installing casework.
  - 6. Include details of utility spaces showing supports for conduits and piping.
  - 7. Show installation details, including field joints and filler panels.
  - 8. Indicate locations of and clearances from adjacent walls, doors, windows, and other building components.
  - 9. As applicable, indicate manufacturer's catalog numbers for casework.
- C. Samples for Initial Selection: For cabinet finishes and for each type of top material indicated.
- D. Samples for Verification: 8-by-10-inch Samples for each type of finish, including top material.
  - 1. Exposed hardware, one unit for each type.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer. Furnish qualification data for Installer, if different from manufacturer.
- B. Keying Schedule: Include schematic keying diagram and index each key set to unique designations that are coordinated with the Contract Documents.
- C. Certifications: Submit documentation verifying use of "No added formaldehyde" and "marine grade plywood" were incorporated into the work of this Section, as acceptable to and when requested by Architect.
- D. Warranty: Sample of special warranty.

### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer with not less than seven years of successful experience, under the current company name, in producing manufactured casework similar to that required for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- D. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project. Installer must have completed projects of similar size and scope to this project in the last 5 years.
- E. Source Limitations: Obtain manufactured wood casework from single source from single manufacturer.
- F. Quality Standard: Unless otherwise indicated, comply with the AWI's and WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.
  - 1. Grade: Custom.
  - 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition

to quality standard.

- G. Product Designations: Drawings indicate sizes, configurations, and finish material of manufactured wood casework. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish material, and complying with the Specifications may be considered as noted below. Refer to Section 012500 "Substitution Procedures" and Section 016000 "Product Requirements."
  - 1. Other manufacturers proposing comparable products shall submit the following for Architect's verification:
    - a. One full-size finished base cabinet complete with hardware, doors, and drawers.
    - b. One full-size finished wall cabinet complete with hardware, doors, and adjustable shelves.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver manufactured wood casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
- B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install manufactured wood casework until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of construction contiguous with manufactured wood casework by field measurements before fabrication.
  - 1. Casework manufacturer is responsible for details and dimensions not controlled by job conditions. Show all required field measurements beyond manufacturer's control on shop drawings.
  - 2. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

#### 1.8 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements in walls and partitions for support of manufactured wood casework.
- B. Coordinate installation of laboratory casework with installation of fume hoods and other laboratory equipment.
- C. Coordinate layout and installation of work of this Section with electrical and plumbing contractors. Coordinate installation so as not to interfere with plumbing and electrical work associated with casework.
- D. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying requirements.

#### 1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of manufactured wood casework that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Delamination of components or other failures of glue bond.
    - b. Warping of components.
    - c. Failure of operating hardware.
    - d. Deterioration of finishes.
  - 2. Warranty Period: Three years from date of Substantial Completion.

## PART 2- PRODUCTS

### 2.1 PLASTIC LAMINATE FACED CASEWORK MANUFACTURERS

- A. Manufacturers for Plastic-Laminate-Faced Manufactured Casework: Subject to compliance with requirements, provide products by one of the following:
1. Basis-of-Design Product: Casework as manufactured by Stevens Industries; Stevens Advantage.
  2. Other Manufacturers: Manufacturers list below are required to meet requirements set forth in this Section. Manufacturing procedures may need to be modified for compliance and technical data on casework construction must be submitted for verification. Other manufactures include, but are not limited to:
    - a. TMI Systems Design Corporation.
    - b. Case Systems.
    - c. LSI
    - d. Precision Craft.

### 2.2 PLASTIC-LAMINATE-CLAD CASEWORK

- A. Drawings indicate sizes, configurations, and finish material of manufactured wood casework from Stevens Industries. Models selected include, but are not limited to, the following:
1. Base Cabinet (123200.A01): Provide casework
    - a. #10129 – 2 Door Base.
    - b. #10421 – Drawer/Door Single RH – Base.
    - c. #10422 – Drawer/Door Single LH – Base.
    - d. #10432 – 2 Drawer, 2 Door Base Cab. – Base.
    - e. #10370 – 4 Drawer – Base.
  2. File Drawer (123200.A05):
    - a. File Base Cabinet (12 32 00.A05): Premanufactured unit fabricated to sizes and onfiguration indicated. Unit shall be plastic laminate clad and consist of two letter sized file drawers. Letter file drawers are designed for front-to-back filing. Reference drawings for units to be lockable
      - 1) Basis of Design: Steven's Advantage model #10316.
      - 2) Dimensions: Refer to the drawings.
  3. Sink Base (123200.A10).
    - a. #10479 – False Front, 2 Door Base Cab. – Base.
  4. ADA Sink Base (123200.A11).
    - a. #10678 – ADA Sink Base – Casework.
  5. Tall Cabinet (123200.A21).
    - a. Tall Cabinet with Adjustable Shelves(123200.A21): Premanufactured unit fabricated to sizes indicated. Unit shall be plastic laminate clad with five shelves, one of which is fixed and the other four adjustable.
      - 1) #25129 - 2 Door Tall Cabinet
      - 2) #25120 - 1 Door RH Tall Cabinet
  6. Wardrobe (123200.A25).
    - a. Unit is plastic laminate clad with two doors with lock, one fixed shelf and clothes rod (approximately 1/2 width of unit with center divider) five shelves on remaining 1/2 of unit one of which is fixed the other four are adjustable. An 8 inch by 10 inch mirror with pin tray shall be provided on back of door.
      - 1) #25617 – Two Door Cabinet.
  7. Wall Cabinet (123200.A31).
    - a. #15101 - Open Wall shelf
    - b. #15120 - 1 Door Cab RH – Adjustable Shelves
    - c. #15121 - 1 Door Cab LH – Adjustable Shelves
    - d. #15129– 2 Door Wall Cab. – Adjustable Shelves
    - e. #15184– 1 Door RH Wall Cab.in Upper Compartment with Adjustable Shelves . Lower Open Compartment.
    - f. #15185– 1 Door LH Wall Cab.in Upper Compartment with Adjustable Shelves . Lower Open Compartment.
    - g. #15186– 2 Door Wall Cab.in Upper Compartment with Adjustable Shelves . Lower Open Compartment.
  8. Mail Cubicle Wall Cabinet (123200.A33).
  9. Filler (123200.A81).

- a. #10803.
  - b. #10805.
  - c. #15803.
- 10. Finished End (123200.A82).
- 11. End Panel (123200.A83).
  - a. #10954.
- 12. Cabinet Locks (123200.A91).
  - a. Drawer and Hinged Door Locks: Provide cam-type locks by COMPTON Timberline.
  - b. Provide a minimum of two keys per lock and six master keys.
  - c. Provide locks on all doors and drawers.
  - d. Inactive door shall receive barrel bolt and strike plate.
- 13. Coat Hooks (123200.A92): Cast aluminum with A14, bright nickel finish. Provide double wardrobe hook, similar to Ives #582.

B. Source Limitations: Obtain plastic-laminate-faced cabinets from single manufacturer.

## 2.3 MATERIALS, GENERAL

- A. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- B. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
- C. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- D. Softwood Plywood: DOC PS 1, with no added formaldehyde (NAUF).
- E. Particleboard: ANSI A208.1, Grade M-2, with no added formaldehyde (NAUF).
  - 1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- F. MDF: ANSI A208.2, Grade 130, with no added formaldehyde (NAUF).
  - 1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- G. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
  - 1. Colors: Refer to Material Finish Legend on drawings for basis of design products.
- H. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
- I. Edge Banding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors, drawer fronts and laminate countertops, 1 mm thick elsewhere.
  - 1. 3mm edge banding shall be machine-applied and set with hot-melt glue.
  - 2. Edge banding colors shall match a solid color of adjacent laminate surface, unless noted otherwise, as determined by Architect. Colors shall not be limited to casework manufacturer's standard stocked colors, but will be selected by Architect from any color group offered by Canplast, Rehau and Doellken-Woodtape.
- J. Edgebanding for Thermoset Decorative Panels: Unless otherwise specified, provide PVC or polyester edge banding complying with LMA EDG-1 and matching thermoset decorative panels.
- K. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.4 CABINET MATERIALS

- A. Exposed Cabinet Materials:
  - 1. Plastic Laminate: Grade HGS for horizontal surfaces and VGS for vertical surfaces.

2. Unless otherwise indicated, provide specified edge banding on all exposed edges.
- B. Semiexposed Cabinet Materials:
1. Plastic Laminate: Grade VGS.
    - a. Provide plastic laminate for semi-exposed surfaces unless otherwise indicated.
      - 1) Color for backs of doors and drawers shall match a solid color of that of cabinet box interior, as determined by Architect. Facings shall be balanced as required by AWI construction guidelines for grade level indicated.
  2. Unless otherwise indicated, provide specified edge banding on all semi-exposed edges.
- C. Concealed Cabinet Materials:
1. Thermoset decorative panels.

## 2.5 DESIGN, COLOR, AND FINISH

- A. Design: Provide manufactured wood casework of the following design:
1. Flush overlay.
- B. Thermoset Decorative Panel Colors, Patterns, and Finishes: As selected by Architect from casework manufacturer's full range.
- C. Plastic-Laminate Colors, Patterns, and Finishes: As indicated by manufacturer's designations on Drawings.
- D. PVC Edgebanding Color: As selected from casework manufacturer's full range, including pre-formulated colors.
- E. Solid Surfacing: As noted on drawings. Where not specifically indicated, as selected by Architect from manufacturer's full range.

## 2.6 CABINET FABRICATION

- A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:
1. Assembly method for cabinets shall utilize "European" assembly screws (threaded steel dowel pins), similar to Hafele "Conformat". At manufacturer's option, alternate doweled assembly methods may be used if in accordance with AWI guidelines and requirements for grade level indicated.
  2. Cabinets boxes below sinks shall be fabricated from plywood and shall receive white plastic laminate on the interior.
  3. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semi-exposed surfaces.
  4. Shelves: Thermoset decorative panels; 3/4-inch thick for spans up to 32 inches and 1-inch thick for spans up to 48 inches.
  5. Open Shelves: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces for spans up to 32 inches and 1-inch thick for spans up to 48 inches.
  6. Backs of Cabinets: 1/2-inch particleboard or 1/4-inch MDF, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semi-exposed surfaces. Backs shall be captured in a 1/2-inch dado and set back 3/4-inch to accommodate 3/4-inch thick nailers.
  7. Drawer Fronts: 3/4-inch particleboard, plastic-laminate faced exposed face and balanced backer.
  8. Drawer Sub-fronts, Sides and Backs:
    - a. 1/2-inch single-species solid-wood or veneer-core hardwood (Birch) plywood, with glued dovetail or multiple dowel joints.
    - b. 1/2-inch, high density fiberboard, 55 pcf density minimum. All parts glued and mechanically fastened using thermosetting fasteners.
    - c. 1/2-inch, high density melamine composite panels. All parts glued and mechanically fastened using thermosetting fasteners.
    - d. Fabricate file drawers and lateral file drawers of width and depth necessary to accommodate hanging file rack system.
  9. Drawer Bottoms: 1/4-inch thermoset decorative panels glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
  10. Doors: 3/4-inch particleboard or MDF, plastic-laminate faced.
  11. Removable Backs: Provide backs that can be removed from within cabinets at utility spaces.

12. Cabinets Bases: Bases shall be fabricated separate from cabinets (not integral). Fabricate from ¾-inch exterior marine grade plywood or preservative-treated 2x4's with marine-grade plywood face. Fabricate in a ladder configuration with plywood fronts and back running continuous for the length of the cabinet. Provide ends, and provide additional runners centered in all cabinets greater than 24 inches wide.
- B. Filler Strips: Provide as needed to close spaces between cabinets and walls, between cabinets and floors, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.
  1. Provide top and bottom fillers and corner panels to close gaps and openings.

## 2.7 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
  1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
  2. Provide caps on fasteners at cabinet interiors in color to match adjacent cabinet finish color.
- B. Frameless Concealed Hinges (European Type): 120 degrees of opening, self-closing. Provide two hinges for doors less than 48 inches high, and provide three hinges for doors more than 48 inches high.
  1. Basis-of-Design: Blum #71T5580 hinges and Blum hinge plate #174H7100E.
- C. Pulls:
  1. Solid aluminum or chrome-plated wire pulls, fastened from back with two screws. Provide 2 pulls for drawers more than 24 inches wide.
    - a. Basis of Design: Provide Hafele "116.05.931" matt aluminum handle.
      - 1) Diameter: 128mm.
- D. Door Catches: Zinc-plated, dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high.
- E. Drawer Slides: BHMA A156.9, Type B05091.
  1. Heavy Duty (Grade 1HD-100): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides. Provide with manufacturer's standard metal rear brackets as applicable.
    - a. Basis-of-Design: GSlide Corporation/Knape & Vogt Mfg. Co.; #GS4200.
- F. Hanging File Rails: Manufacturer's standard hanging file rail system. Provide integral system at all base cabinet drawers with dimensions that will accommodate hanging files.
  1. At 36" wide base file cabinets, provide rails on front and back for standard legal side filing. Provide two (2) removable crossbars per drawer for optional letter/legal front-to-back filing.
- G. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of manufactured wood casework.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 CASEWORK INSTALLATION

- A. General: Install cabinets to comply with same grade as item to be installed.
- B. Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to masonry or framing, wood blocking, or reinforcements in walls and partitions with fasteners spaced 24

inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.

1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
- D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, or framing, blocking, or reinforcements in walls or partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
1. Fasten through back, near top and bottom, at ends, and not more than 16 inches o.c.
  2. Use toggle bolts at hollow masonry.
  3. Use expansion anchors at solid masonry.
  4. Use No. 10 wafer-head screws sized for 1-inch penetration at wood hanging strips.
  5. Use No. 10 wafer-head screws sized for 1-inch penetration into wood blocking.
  6. Use No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish at metal-framed partitions.
- E. Fasten cabinets to adjacent cabinets and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- G. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

### 3.3 INSTALLATION OF SHELVING

- A. Securely fasten shelf standards to masonry, partition framing, wood blocking, or reinforcements in partitions.
1. Fasten shelf standards at ends and not more than 12 inches ( ) o.c.
  2. Use toggle bolts at hollow masonry.
  3. Use expansion anchors at solid masonry.
  4. Use self-tapping sheet metal screws in metal framing or metal backing at metal-framed partitions. Do not use wall anchors in gypsum board.
  5. Use wood screws sized for 1-inch ( ) penetration into wood blocking.
  6. Use toggle bolts at plaster on metal lath.
- B. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Space standards not more than 36 inches o.c.
- C. Install shelving level and straight, closely fitted to other work where indicated.

### 3.4 CLEANING AND PROTECTING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION

## **SECTION 123666 - SOLID SURFACING COUNTERTOPS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Solid surface material countertops (123666.A01).
  - 2. Solid surface material transaction counters (123666.A02).
  - 3. Solid surface material backsplashes and end splashes (123666.A03).
  - 4. Solid surface material sills (123666.A05).
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for blocking as required.
  - 2. Section 064023 "Interior Architectural Woodwork" for conceal bracket.
  - 3. Section 064023 "Interior Architectural Woodwork" for custom casework.
  - 4. Section 079200 "Joint Sealants" for countertop sealants.
  - 5. Section 123200 "Manufactured Wood Casework" for premanufactured casework.
  - 6. Division 22 "Plumbing" for plumbing fixtures

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated, submit data describing materials, fabrication, hardware accessories, and installation instructions.
- B. Shop Drawings: Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures, as applicable.
  - 1. Show locations and details of joints.
  - 2. Show direction of directional pattern, if any.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
  - 1. Countertop material, 6 inches square.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For fabricator.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

#### **1.5 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Shop with not less than seven years of experience, under the current company name, that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products or manufacturer's authorized representative who is trained and approved for installation of units required for this Project. Installer must have completed 7 projects of similar size and scope to this project in the last 5 years.

- C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
  - 1. Build mockup of typical countertop, transaction counter, and sills as shown on Drawings.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect solid surfacing during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver solid surfacing, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate solid surfacing which have been completed in installation areas

## 1.7 FIELD CONDITIONS

- A. Field Measurements: Where work of this Section is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Verify dimensions by field measurements before fabrication is complete.
  - 1. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

## 1.8 COORDINATION

- A. Solid surfacing subcontractor shall coordinate with the mechanical & electrical contractors to assure proper working clearances, receptacle/fixture locations, and all connection/fittings necessary to function properly.
- B. Coordinate locations of utilities that will penetrate countertops[ ,transaction counters] or backsplashes.
- C. Coordinate layout and installation of framing and reinforcements in walls and partitions for support of work of this Section.

## PART 2 PRODUCTS

### 2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
  - 1. Type: Provide Standard type unless Special Purpose type is indicated.
  - 2. Colors and Patterns: As indicated by manufacturer's designations on Material Finish Legend.
- B. Particleboard: ANSI A208.1, Grade M-2, except at countertops with sinks, provide Grade M-2-Exterior Glue.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- D. Basis-of-Design Product: Subject to compliance with requirements, provide Corian Solid Surface or comparable product from an available manufacturer submitted to and accepted by Architect prior to bidding:

### 2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - 1. Grade: Premium.
- B. Configuration:
  - 1. Front: Straight, slightly eased at top.
  - 2. Backsplash: Straight, slightly eased at corner.

3. End Splash: Matching backsplash, as applicable.
  4. Sills: Straight, slightly eased at top.
- C. Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 1/2-inch- thick, solid surface material.
- E. Fabricate in one piece, unless otherwise indicated. Comply with solid surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
- F. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
1. Fabricate with loose backsplashes for field assembly.
  2. Install integral sink bowls in countertops in the shop. Ease edge or chamfer edge at sink to countertop connection.
- G. Joints: Fabricate countertops (up to 10 feet in length) without joints.
- H. Joints: Fabricate countertops (greater than 10 feet in length) in sections for joining in field.
1. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
  2. Splined Joints: Where narrow strips of solid surface material between joints occur to form large openings, provide splined joints. Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit.
- I. Cutouts and Holes:
1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop, to best extent possible, using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
    - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
    - b. Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch into fixture opening.
    - c. Provide 3/4-inch full bullnose edges projecting 3/8 inch into fixture opening.
  2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
  3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
  4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

### 2.3 ACCESSORIES

- A. Wire-Management Grommets (123666.A11): Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
1. Cable Passage through Grommet for Countertops: 2-1/2-inch OD, molded-plastic grommet with flip top matching plastic caps with slot for wire passage. Color as selected by Architect.
    - a. Basis-of-Design Product: Doug Mockett and Company, Inc.; Model EDP3.

### 2.4 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."
- C. Fasteners: Provide non-corrosive fasteners as required for complete installation of components and assemblies. Type and size shall be as required for conditions, materials and superimposed loads involved.
- D. Accessories: Comply with manufacturer's recommendations for hardware, non-corrosive fasteners, adhesives, sealers, fabrication and finishing.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
  - 1. Install metal splines in kerfs in countertop edges at joints as specified. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
  - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- F. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
  - 1. Seal edges of cutouts in particleboard and plywood subtops by saturating with varnish.
- H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION